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**REPORT ON THE FEASIBILITY OF AN  
ELECTRONIC BENEFIT TRANSFER SYSTEM  
FOR THE FOOD STAMP PROGRAM**

**Submitted To:**

**Economic Analysis Staff  
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## EXECUTIVE SUMMARY

The Department of Agriculture's Food Stamp Program, amounting currently to \$10.3 billion annually, has become a growing target of fraud and abuse. Current issuance procedures do not always operate efficiently, causing additional loss through administrative error. Consequently, the Food and Nutrition Service of USDA has undertaken an assessment of alternative methods of issuing food stamp benefits to determine how these problems might be addressed. One method under consideration is use of electronic funds transfer technologies as a means for transferring program benefits. Called an electronic benefit transfer (EBT) system, the system would replace paper food stamp coupons with electronic impulses as the medium of exchange in the transaction of benefits. These impulses can be transmitted from central files over a communications network linking the file to retail stores or can be carried by program participants in a plastic card which is inserted into special terminals at the food store. While an electronic benefit transfer system would cause a significant change in the operations of the existing paper-based food stamp issuance systems, the character of the Food Stamp Program itself would not change significantly.

### POTENTIAL EBT BENEFITS

The potential benefits of an EBT system to the Federal and State governments include:

- Significant Reduction of Fraud and Abuse within the Issuance System—An EBT system would eliminate those opportunities for fraud, theft and abuse associated with paper coupons and authorization cards, making it extremely difficult to obtain duplicate or multiple benefits as is often possible under the current system. The electronic system would provide superior reporting and audit trails for the precise control and accounting of program benefits issued. Counterfeiting of the paper coupons would be eliminated and the unauthorized use of food stamp benefits significantly curtailed. If a food stamp card is reported as stolen or not received, the card can be immediately voided through the electronic system. The expected reduction in fraud and abuse can result in similar reductions in fraud investigations efforts on the issuance side, with greater concentration of such efforts on eligibility certification problems. The estimated amount of reduction in fraud and abuse has not been developed, but it can be expected to be significant, particularly with regard to a reduction in the number of duplicate benefits issued.
- Streamlining the Delivery Process—The number of people handling the food stamp coupons, from the time of printing to the shredding of the coupons at the end of the cycle, would be greatly reduced. This will improve the efficiency of the issuance process, not only reducing the losses from theft and fraud, but also the Federal costs of food stamp production and distribution, estimated at \$43.6 million annually or \$5.24 per household, not including Federal, State and Local administrative costs.

- Reduction of Administrative Error. The issuance, reporting and reconciliation processes will no longer be manual, thereby substantially reducing opportunity for error. Improved audit trails will provide a further mechanism for reducing error within the system. In FY 1981 reported issuance loss and error costs were estimated at \$36.95 million, or \$4.44 per household.
- Improved Public Image for Food Stamp Program and for Recipients—An improved technology for food stamp issuance, particularly one associated with the current state of the art in electronic payment systems, will improve the program's public image. An EBT system which looks like other payment systems will make the food stamp recipient less conspicuous and stigmatized.
- Reduced Operating Costs—Current Federal and State administrative costs (FY 81) are estimated to be \$260 million or an overall average \$31.24 per household. The estimated yearly operating costs for an EBT system range from \$21.31 to \$22.55 per household, depending on the type of EBT approach taken.

It would therefore appear that operating costs for an EBT system would be less than for the current issuance system. While estimates of potential fraud and error losses in an EBT system were not developed explicitly, it is expected, on the basis of operating experience with similar large EFT systems, especially due to their strong audit trail capabilities, that issuance losses due to fraud and error would be slight in an EBT system.

### THREE ALTERNATIVE EBT SYSTEM APPROACHES

The feasibility of three EBT approaches were examined. These approaches include:

- An on-line system utilized solely for the Food Stamp Program (called a dedicated or stand-alone system)
- An on-line system shared by the Food Stamp Program and other commercial users (also called a piggybacked system)
- An off-line system dedicated to the Food Stamp Program (also stand-alone)

Essentially, there are two general types of electronic payment technologies: on-line and off-line. The on-line/off-line distinction refers to the actual mode of benefit transfer from food stamp recipient to retailer. In the on-line system, each retailer is physically linked via terminals and communication lines to a computer data base in which the recipient's benefits are recorded. The transaction at the retail location triggers the computer to debit the recipient's benefit, crediting the same amount to the retailer or his designated bank.

For on-line systems two approaches can be taken:

- Stand Alone On-Line System: An EBT System Dedicated to the Food Stamp Program—At the retailer, the benefits would be debited on-line from the State data base. The State would transmit the retailer dollar amounts to the Federal Reserve System which would in turn deposit funds into the retailers' depository institutions through existing electronic clearing networks.
- Piggybacked System: An EBT System Which Shares With Other Users Equipment at the Point-of-Sale—At the retailer, both food stamp recipients as well as other customers with bank debit cards could use the same equipment (personal identification number pad, printer, swipe card reader) to debit on-line their account (whether food stamp account or checking account). The communication links between retailer terminals and an EFT switch serving both financial institutions and the State would also be shared. The lines from the State to the switch would not be shared, but the food stamp application would make use of the switch to the financial institution communication lines in crediting retailer accounts. This settlement process would be facilitated by using the existing ACH network.

The off-line system differs in that the food benefit value is contained in a tiny microprocessor "chip-in-card." When the card is presented to the food retailer, the retailer inserts the card into a card reader device which supplies power to the microprocessor chip. Food stamp value is transferred from the recipient's card and to the retailer's card (or cartridge). The smart card terminal should have the ability to communicate with the State central computer over the existing telephone network. This link is necessary to load and update a "blacklist" of lost or stolen cards from the State computer files and to transmit the payment transactions from the retailer cartridge.

#### DETERMINATION OF FEASIBILITY OF THE APPROACHES

The three system approaches were examined in the following areas:

- Technical Feasibility—Has the technology been developed and proven successful in environments similar to the food stamp environment?
- Economic Feasibility—What are the estimated costs of the three approaches and how do these compare to the current system?
- Additionally, two other questions—one regarding the programmatic feasibility of an EBT system and the other regarding its implementation feasibility—were examined. They are:
  - Can the technology be adapted to the Food Stamp Program requirements satisfactorily?
  - Given the technical, economic and programmatic feasibility, will an EBT system be accepted by the food retailer and banking industries?

## KEY ROLE OF FOOD RETAILER ACCEPTANCE IN EBT SYSTEMS

When studying the potential of an EBT system, extra consideration must be given to the key role the food retailers will play in its success. As long as the system is to substitute some form of electronic payment at the food retail point-of-sale for food stamp coupons, the food retailer must be able and willing to participate in the system. Any system that does not satisfy the needs and demands of the food retailing industry cannot succeed. The issues of greatest importance to the retailer are those of productivity and costs.

- Retailers Historically Slow to Accept POS Systems—Historically, retailers have been slow to accept point-of-sale (POS) systems in their stores for several reasons:
  - For credit card based POS transactions, retailers were charged a percentage of all transactions
  - Retailers were often assessed a terminal charge
  - The majority of customers could not use the system
  - Equipment took up valuable counter space or was incompatible with existing equipment
  - POS transactions slowed check-out counter throughput
- Food Retailers Operate on a Very Low Profit Margin—Food retailers operate on a very low profit margin of 1 percent or less and feel they cannot afford the extra costs associated with the POS systems. Retailers would, therefore, be opposed to any EBT system which would require any payment on their part, whether for the equipment purchase or for transaction fees, unless it can be shown that the system would decrease their overall costs.
- Electronic Cash Registers and Scanning Systems Improved Retailer Productivity—Productivity is an integral part of the overall cost issue. Large retailers have increasingly moved to procedures and equipment at the check-out counter which will speed up throughput. This equipment has multiple capabilities:
  - Separation of the total cost of eligible food items from ineligible items
  - Universal Product Code (UPC) scanning systems on line to a store computer for financial and inventory control functions
  - Check authorization for store customers holding a courtesy card

Medium sized retailers and some small retailers often have similar capabilities with their electronic cash registers, although most smaller stores will not have the in-store computer capabilities and scanning equipment which is only affordable for some medium sized stores. An EBT system integrated with existing retailer equipment would be more acceptable than an EBT system which could not be integrated.

- EBT System's Impact on Retailer Productivity—The impact of an EBT system on retailer productivity will occur at the check-out counter in terms of increased or decreased throughput. The following changes in productivity at the check-out counter can be expected to occur:

- Increased Time to Check Out If Only Food Stamp Recipients Use System—Food retailers claim that food stamps are handled similarly to cash at the check-out counter. Therefore, the use of an EBT card in place of food stamps can be expected to require more time in order to swipe the card through a magnetic stripe reader, to enter a personal identification number, and to print a receipt for the food stamp amount as well as for any other purchased items.

Current electronic cash registers separately total the food stamp amount; if this amount must be reentered into another piece of equipment, this will require additional time, as would be necessary if the food stamp EBT equipment is not integrated with the existing retailer equipment. Integration with existing equipment would be possible with electronic cash registers at the medium and large retailers. Smaller retailers may require separate dial-up terminals and separate entry of the food stamp amounts. Exception situations, such as insufficient funds or benefit amounts, inability to recall or enter the PIN, or a malfunctioning or inoperative system, are all cause for retailer concern. The occurrence of any of these situations would reduce retailer productivity.

- Decreased Time to Check Out If The Majority of Customers Can Use System—An on-line point-of-sale system which could be used for other customers can increase productivity. Customers who normally write checks can use a debit card to pay for their groceries. Check authorization, verification, and writing in the purchase amount would no longer be needed. A swipe of the card and entry of a PIN number is a faster transaction than a check transaction. Productivity in small stores would not, however, show an appreciable increase because small stores with dial-up terminals would still have to manually enter the transaction amount into the terminals, whether for food stamp recipients or for other customers. The majority of check cashing customers would have to have the ability to utilize the POS equipment in order for any increase in productivity to occur.

In conclusion, retailer productivity in general could decrease, somewhat particularly for systems dedicated solely to food stamps. Even with a shared system in a large retail outlet, the productivity could not be expected to increase significantly unless the majority of customers had the ability to use the system.

- Advantages Not Related to Productivity—An EBT system does, however, offer some advantages to the retailer not related to productivity. Food stamps must be separated from the cash receipts, hand cancelled, and counted prior to bundling the stamps separately and depositing them with the bank. Once the stamps are deposited, several days may elapse before the food stamp value is deposited in the retailer account. As this is money on which the bank and retailer cannot earn interest, an electronic system with faster crediting of cash would have value to the retailer and to the bank. Retailers claim, however, that these costs are very slight and in fact marginal; elimination of coupon-handling allow a reduction in employees in even the largest stores.

Real advantages could be gained, according to retailers, if cash and paper handling of all types was decreased (including checks). Such results might occur if the system in place could be used by many customers; an example might be a system allowing use of debit cards by non-food stamp clients as well as the on-line or off-line mechanism for the EBT system. Short of such advantages to retailers, clear incentives would have to be offered to gain retailer acceptance for a dedicated food stamp system, whether it would be on-line or off-line.

- Piggybacked On-line System Appears Most Advantageous—The advantages are somewhat greater for a piggybacked on-line EBT system. In this case, the retailer could realize the following advantages:
  - Reduced bad check loss from non-food stamp customers
  - Reduced cost to process the checks (banks over the costs to process checks in service charges to the retailer; these charges would be reduced)
  - Faster deposits into the retailer's account from customer checking accounts, with a concomitant decrease in accounts payable
  - Potential for linkage with other systems to allow other customers to use the system and technology

Even with these advantages retailers are not likely to accept a system for which they would have to pay terminal charges or transaction fees.

There is a major obstacle in implementing a piggybacked on-line EBT system. Currently, only three grocery stores in the country have been identified which have a point-of-sale system operating at the check-out stands. (These are vendor supported applications in Iowa and New Hampshire.) Although the system requirements up to the point-of-sale are in place in numerous areas of the country with EFT transaction and communications switches, automated clearinghouse networks (ACH) and banks, POS equipment is virtually non-existent in retail grocery stores. To piggyback on the more widespread bank-based systems, communication links would be required between the stores, switches, or State office plus equipment placement at the point-of-sale.

#### USDA CONSIDERATIONS ABOUT EBT CAPITALIZATION COSTS

Steady-state capitalization cost estimates for implementation in a large project area (100,000 households) for the three EBT approaches ranged from \$14.95 to \$97.29 per household, or \$1.495 million to \$9.729 million. Terminal costs alone range from \$750 to \$1,500 each, depending upon the EBT approach taken and the size of the retailer. (Note: For a piggybacked EBT system, terminal costs will be paid by other users within the system. However, terminal costs are only one aspect of the total system.)

Given that there are 230,000 retail outlets currently authorized to redeem food stamps, many of which have multiple check-out lanes, USDA must determine whether the food stamp transaction volume justifies the installation of expensive terminals (and other equipment, such as communication lines) in all authorized retail outlets or at all check-out lanes. FNS survey data have indicated that the 8.3 million eligible households account for approximately 21 food stamp transactions (at a total volume of \$245) per check-out stand per day when averaged across all types of grocery stores participating in the Program. But some currently participating retailers have very small volumes of food stamp activity. The USDA may have to consider additional requirements for authorization of retailers in order to justify installation of expensive equipment.

#### RECOMMENDATIONS FOR EBT ALTERNATIVES

##### Recommendation No. 1

The Food and Nutrition Service should sponsor a full scale demonstration of a piggybacked on-line system to determine its implementation feasibility in terms of the Food Stamp Program.

- On-line Systems Are The Most Proven—On-line systems are currently in operation in the U.S. The success of electronic funds transfer, both proprietary and shared, by financial institutions has contributed to their rapid growth. Although debit card point-of-sale transaction systems are still being cautiously tested by retailers in many parts of the country, expansion and acceptance by retailers is expected to continue.

- Off-line Systems Are Not Yet Fully Tested—Rigorous testing of the off-line smart card is scheduled to begin at retail outlets later this year in France. To date, participating retailers have not been identified, probably because retailers will be required to pay \$40 per month in terminal rental and 0.6 to 1.2 percent of the transaction amounts, depending upon volume. Retailer acceptance of the system, a critical determinant in the success of the smart card, remains to be seen.
- Most Acceptable System To Retailers Because More Customers Can Use It—Believed to be the most acceptable approach to the food retailers, a piggybacked on-line system would permit, in many cases, integration of the retailers' existing electronic equipment. The piggybacked system could be used by far more customers than food stamp clients, thereby providing some incentives for the retailers to accept the system.
- Piggyback On-line System Will Be Most Cost Effective—Initial capitalization and operating costs would be shared by banks participating in the system. Existing communication links would be employed. Additional requirements at the point-of-sale are less in this approach than any in any other. Based on economic production levels for equipment and well developed application software and system design, the estimated costs for a large scale implementation of 100,000 households for steady-state operation of an EBT system (i.e., after demonstration of feasibility) in a 100,000 household area for the three EBT approaches would be:

<u>100,000 Households</u>	<u>Piggybacked On-Line</u>	<u>Stand Alone On-Line</u>	<u>Smart Card Off-Line</u>
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Initial Capitalization:

Total	\$1,495,000	\$6,191,000	\$9,729,000
Per Household	\$14.95	\$61.91	\$97.29

Operating Costs

Total/Year	\$2,131,428	\$2,444,858	\$2,555,320
Per Household	\$21.31	\$24.45	\$25.55

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Smaller scale implementations would have a higher per household cost for both capitalization and operations and any size demonstration project will have higher costs, due to the initial design and development costs which must be absorbed.

Recommendation No. 2

The Food and Nutrition Service should solicit vendor proposals for off-line EBT systems to include other advanced technologies besides smart card technology. This would permit USDA to continue to monitor the smart card developments and

test in France prior to committing funds for a pilot demonstration in the United States. The USDA solicitation should include specifications of off-line requirements appropriate to Federal and State benefit programs and retailers. The smart card technology has many very attractive features and for this reason should not be discounted. However, prior to the application of such an advanced technology in any full scale demonstration, the technology itself should be tested and debugged in a live, retailer environment.

- Smart Card Technology Has Lower Communication Costs—Off-line systems do not require dedicated lines for electronic funds transfer. The retailer can use public phone lines to transfer the client and cost data to the State data base and to update the retailer cartridge with lists of lost and stolen cards once a day or as convenient.
- Smart Card Security Is Very Advanced—Three wrong attempts to enter a personal identification into the smart card will cause the benefit value memory to be "locked," thus preventing unauthorized access to the benefit value within the card.
- Smart Card Terminals Can Be Portable—A portable card reader can be developed to operate via a battery thereby allowing access by the food stamp client to any types of food vendor, including the seasonal vegetable stand. The food vendor would need to access a telephone line only periodically. This addresses some of the programmatic issues associated with on-line systems which may "go down" or be inoperable for some reason. Alternative back-up procedures for use during machine down time, which are necessary for on-line systems, would also be needed for an off-line system.
- Vendors Need to Develop Interfaces for Existing Retailer Equipment and to Reduce Terminal Costs—The technology is rapidly undergoing changes and development. The French have not yet developed card reader equipment which will interface with existing electronic cash registers. This causes duplication of equipment at the point-of-sale, an unacceptable situation for food retailers. Current terminal (prototype) costs are estimated at \$10,000 to \$15,000 per unit, but these include many ECR and on-line terminal capabilities not needed in a food stamp benefit transfer system as such. Estimates for production quantities are optimistically placed at \$1,500. Vendors need to reduce these costs to below \$500 per terminal.

#### Recommendation Number 3:

FNS should immediately establish a Task Force of representatives from the major food retailer organizations to participate directly with the Department in specifying the design and operating requirements of EBT system(s).

- Experience Has Shown That POS Systems Which Do Not Meet Retailers Needs Are Accepted With Difficulty—Systems designed by financial institutions or others for retailers without their participation have often shown either failure of acceptance or delays before success is achieved.

- Food Retailers Have Specific Requirements Regarding Productivity and Equipment Costs Which Must Be Met—Because of the major investments already made in equipment and systems by food retailers in the United States, and because of the economic characteristics of the retail grocery industry, food retailers have already indicated the minimum performance requirements for new systems in their stores: No diminution in productivity in large stores and no substantial additional equipment costs.
- A POS System Which Would Serve Many Food Store Customers Would Offer Meaningful Advantages To The Retailers And May Have The Best Chance for Success

At this time, most of the advantages of a stand-alone EBT system are seen as relatively minor by the retailers; it would produce few savings in daily operations to offset potential disadvantages. However, a system which decreases the handling of checks and cash, as well as food stamp coupons, and could be used by all types of customers could provide real savings to retailers and encourage their participation.

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CHAPTER ONE  
INTRODUCTION

## I. INTRODUCTION

### 1. THE FEASIBILITY REPORT IS TO PROVIDE A BASIS FOR DECISION MAKING BY THE FOOD AND NUTRITION SERVICE

The Food and Nutrition Service (FNS) of the U. S. Department of Agriculture (USDA) has for some time had under consideration a number of proposals which involve the electronic transfer of benefits as an alternative to present methods of delivering program benefits to eligible recipients. Such a system would eliminate food coupons and rely instead on computerized debit of the recipient's allotment when the benefits are redeemed at authorized retail outlets.

Households certified under this system would proceed directly to the retailer without an intermediate stop at an issuance point to obtain food stamps benefits. At the store, through one of several alternative technologies, the cashier would verify the household's entitlement and allotment balance using information printed and/or encoded on the household's identification card. The transaction, when completed, would decrement the benefit balance by the amount of the sale.

Before acting on any of the proposals it has received and before asking for additional information on alternatives, FNS determined that an independent contractor should research and assess the technical and financial feasibility of electronic benefit transfer (EBT) systems within the Food Stamp Program. In so doing, the contractor was to identify and examine issuance alternatives which would meet FNS needs, whether those technologies were operational or were still in the development stage. Birch & Davis Associates, Inc. and The Orkand Corporation, subcontractor to Birch & Davis, were selected as the independent contractors to conduct the study.

This Feasibility Report is the result of that assessment of EBT technologies. It focuses on the feasibility of implementing the EBT concept in the Food Stamp Program environment. The Report is designed to provide FNS with information which will allow a decision to be made about the desirability and appropriateness of undertaking live pilot or demonstration activities employing one or more EBT technologies in one or more States.

2. ELECTRONIC FUNDS TRANSFER TECHNOLOGIES MAY BE USED IN AN ELECTRONIC BENEFIT TRANSFER SYSTEM

An electronic benefit transfer system for food stamp issuance would build upon electronic funds transfer (EFT)\* technologies. Some of the major issues to be addressed regarding EFT applicability and utility are listed below:

- Are The Alternative Technologies Sufficiently Developed To Be Realistically Assessed For Application To The Food Stamp Program? What has been the historical development of EFT technologies? What problems have been encountered? Which technologies have been accepted and/or discarded as unworkable? What has been the degree of acceptance of these technologies by the public, financial institutions, and retailers, particularly food retailers? What have been the incentives (financial and otherwise) for acceptance of these technologies?
- Are Existing Or Developing EFT Technologies Compatible With The Food Retail Environment? What incentives or disincentives are there in the food retail environment to adopt EFT technologies? What would be the impact on productivity? What would be the financial impact on the retailers? What kind(s) of EFT system(s) would be most compatible with all types of food retailers?
- Are The Technologies Applicable Also To Other Environments Currently Accepting Food Stamps? Will the non-food retailer (i.e., nursing homes, meals-on-wheels, etc.) have the capability to tie into an EBT system?
- Can Client Access Be Maintained? What will be the limitation (if any) on clients in their ability to purchase food within an EBT system? Will they be able to continue to use any food store check out lane, any authorized grocer, or to purchase fresh vegetables and fruit from authorized produce vendors?
- Is It Realistic To Expect That The New Technologies Will Be Economically Advantageous While Meeting Stringent Programmatic Requirements? At what point will system costs exceed benefits in terms of implementation and access? Is the system feasible in small volume stores as well as in large volume outlets? Are there cost advantages in terms of productivity, float, and paper handling to the retailer?

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\* Electronic funds transfer (EFT) is a term employed by the private sector to refer to the crediting or debiting of funds from one account to another without physically transferring the dollars, but by computer-to-computer interaction. Electronic benefit transfer (EBT) is the name given to a system which would enable debiting by a client of a specific benefit or allotment which had been credited to his account for a particular time period, based upon his meeting certain eligibility criteria. EBT would rely on EFT technology to a large extent.

- Can These New Technologies Reduce Fraud And Loss Within The Program? Can fraud and abuse be eliminated within an EBT system? What new opportunities for fraud will occur? What will be its magnitude? Will the system provide adequate audit trails and procedures to detect and inhibit fraud? Will it facilitate recovery of the amounts lost? If there is a reduction in losses and fraud, are the savings sufficient to justify the costs of the system?
- Will The New Technologies Be Acceptable To System Users? Can clients adjust to the use of an electronic benefit transfer card which may require both the ability to read and to use a memorized personal identification code? How will clients react to the high level of automation? Will retailers and their depository institutions be willing to change their electronic data processing (EDP) systems and retrain their employees? Will the States and project areas change their current systems and retrain their staff? Will the States' automated files—the HIR master files—have the capability to handle electronic benefit transfers? Will States be willing to accommodate the necessary changes given that the economies of scale or cost effectiveness may not be evident within the short run?

These and other issues have been raised and addressed in the conduct of this study.

Electronic funds transfer systems are currently operating successfully in a number of environments, which gives cause to believe that the technological capability does or will soon exist for the operation of a similar system for food stamp benefit transfer.

### 3. THE FEASIBILITY STUDY IS AN ASSESSMENT OF THE TECHNICAL AND FINANCIAL FEASIBILITY OF AN EBT SYSTEM

The primary objective of the study was to provide FNS with sufficient information on the technical and financial characteristics of an EBT system to permit an informed decision on whether and how to pursue the concept to a pilot or demonstration phase. Specific areas investigated include the following:

- Technical Feasibility

Technical feasibility includes an investigation of the technology, equipment, and communications requirements to make the system operational. Also included is consideration of whether such a system can be made available to food stamp clients on a broad scale, the role of banks, and satisfaction of program requirements. This includes:

- Programmatic Adequacy—The ability of the system(s) to meet Food Stamp Program requirements
  - .. Participant Access—To a wide-variety of food retailers
  - .. Equal Treatment—At check out counters

- .. Knowledge Of Client's Allotment Balance—Without having to make a food purchase
- .. Expedited Service—To provide benefits to households having an immediate need
- .. Household Transfers—For households moving in and out of EBT system project area without loss of benefits
- .. Change of ID Cards Or Numbers—For replacement cards which are stolen or lost
- .. Accountability—Within the system to restrict access to the system, to protect the clients' confidentiality and to protect unused benefits from unauthorized use
- Timely reimbursement of retailers, response to multiple retailer inquiries, equipment and system failures, and error correction
- Compatibility with existing retailer systems
- Redundancy and reliability requirements to assure system operations
- Adequacy of communications networks to support the system requirements
- Equipment, hardware, and software requirements
- Interface requirements

- Financial Feasibility

Estimated and potential savings associated with the new system are developed and compared to the current costs of food stamp coupon issuance. The following categories are investigated for prospective EBT systems:

- Initial capitalization costs for various food stamp project area scenarios and for full development of a system versus integration of some components with appropriate existing systems
- Projected operating costs by size of area, both for a government owned system and for one integrated with existing private sector systems
- Comparison of development and operating costs with real and hidden costs in the existing food stamp program issuance system

To determine the financial feasibility of the EBT options and to compare the cost estimates with costs of current systems, nine "scenarios" are developed. These are different types and sizes of hypothetical Food Stamp Program project areas and as such present different requirements for configurations of equipment and operations. Clearly the estimates for the scenarios present only broad ranges as so little experiential data exists for such systems, especially at the retail food store level. However, they provide a basis for comparison among different environments, with limitations.

Three alternative approaches for EBT System development were studied. These are:

- An on-line system utilized solely for the Food Stamp Program (also called a "dedicated" or "stand alone on-line" system)
- An on-line system shared by the Food Stamp Program and other commercial users (also called a "piggybacked" system)
- An off-line system dedicated to the Food Stamp Program (also called a "stand alone off-line" system)

Essentially, there are two types of systems: on-line and off-line. In the on-line system, authorized retailer outlets are directly linked to a central computer file for transaction authorization, crediting, and debiting of accounts; the system can be limited solely to Food Stamp recipients or shared (piggybacked) with other users. In an off-line system dedicated to food stamp recipients these functions would occur at the point-of-sale without this communications requirement.

The study of the feasibility of on-line and the off-line systems was built upon analysis of a variety of operating systems in use today and the changes to these systems which would be required to meet FNS objectives. Thus, conclusions regarding the feasibility of the approaches which could be taken for an EBT system are largely based upon findings relative to systems already existing. Where new, untested technologies are studied, conclusions are based upon industry estimates, rather than upon verifiable operational results and data.

4. THE OBJECTIVE OF THE ISSUANCE PROCESS IS TO DELIVER THE  
CORRECT BENEFITS TO THE APPROPRIATE HOUSEHOLDS IN A  
TIMELY AND RELIABLE MANNER

"Issuance" is the process by which Food Stamp program benefits are delivered to certified eligible households. This definition excludes the circumstances under which households apply for benefits and the process by which eligibility is determined, generally called certification. The overall objective of the general issuance process is to deliver the correct benefits to the appropriate (i.e., certified eligible) households in a dependable and timely manner while operating efficiently and maintaining internal control of and accountability for the benefits.

Food Stamp issuance to certified eligible households under a program involving use of coupons includes four functions. All of these functions are highly interrelated, sometimes not totally discrete, and subject to considerable variation in their performance in States and project areas. A variety of actors and agencies are involved, as indicated in Exhibit I-1. Each issuance function is briefly described below:

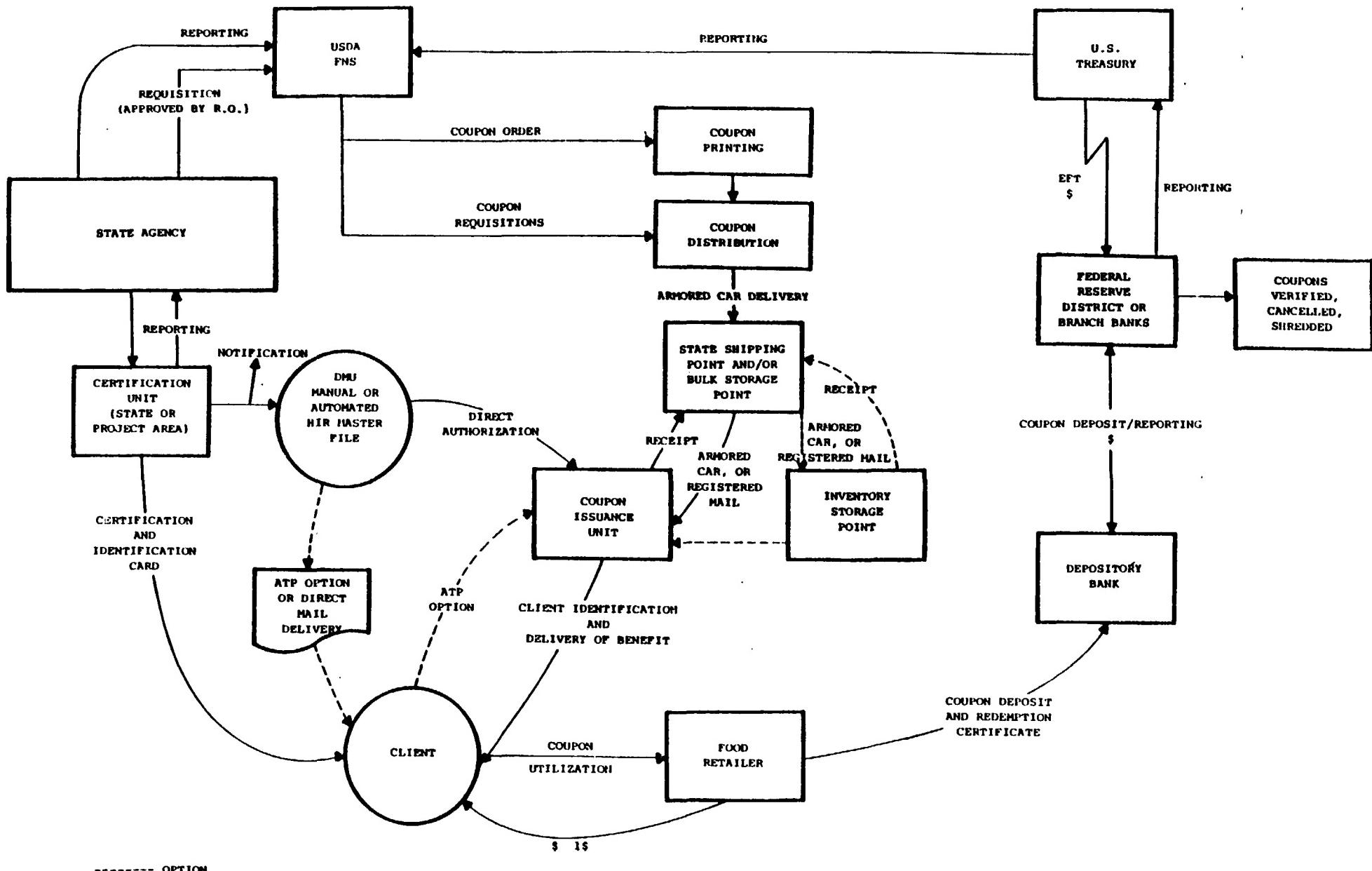
- Notification Of The DMU Of The Client's Benefit Entitlement—The food stamp issuance process commences when the client is certified as eligible by the certification unit and the client's record is forwarded to the DMU so that the case is added to the household issuance record (HIR) master file. In those systems where the determination of eligibility is aided by a computer system, which may also calculate the recipient's food stamp allotment, notification occurs at the point of keying the client data into the computer system.
- Authorization For Delivery Of Benefits—Authorization occurs when approval is given to the delivery unit to deliver benefits to the client or his/her authorized representative. The mode of authorization will differ depending on the type of issuance system in operation.
- Verification Of Client Identity At The Delivery Unit—The client receives an identification card on becoming eligible for food stamp benefits. This identification card provides the basis for most of the verification of identity subsequent to certification. When the client presents him- or herself to collect the food stamp benefit, a valid, signed food stamp identification card must be presented. The client's or authorized representative's signature is required to be recorded on an issuance log or on the authorization document. The two signatures are compared prior to the issuance. In those systems where food stamps are mailed directly to clients, verification of identity is required only if non-receipt of the coupons is reported by the client.
- Delivery Of Benefits To The Client By The Delivery Unit—The transfer of coupons to the client may be performed in one of two ways—either by mail or over-the-counter at a delivery unit. These units may be any of a variety of authorized locations, including banks, post offices, check cashers, food stamp or other governmental offices, or other authorized issuance points. The authorizing document is retained to provide a basis for coupon reconciliation and to provide an audit trail.

There are three other related functions for coupon-based issuance which are of relevance to the study:

- Coupon Production and Distribution—Food stamp coupons are produced under Federal contract; the manufacturers of the coupons ship them to shipping points or to bulk storage points within each State in response to receipt of a requisition for the coupons.

EXHIBIT I-1

THE FOOD STAMP ISSUANCE PROCESS



- Reporting and Reconciliation—Reporting and reconciliation occurs at various points throughout each food stamp issuance system; these functions allow the monitoring of the performance of the issuance system by the States and by the Federal Food Stamp bureaucracy. The first level of reporting and reconciliation occurs at the issuance point, whether that be an over-the-counter operation or a delivery unit responsible for direct mail delivery. If issuance occurs at more than one point within a project area, then the project area is usually responsible for submitting required reports to the States. States then aggregate the reports from the project areas and submit State-level reports to the FNS Regional Office and to FNS Washington. Reporting and reconciliation continues to occur throughout the system at the depository banks, Federal Reserve Banks and U.S. Treasury.
- Redemption of Benefits by Client and Retailer—The redemption of food stamps by the client at an authorized retail food store is uniform across the States. The client presents the coupons for eligible food items and the coupons are taken by the retailer in exchange for these goods. The amount of cash that may be returned as change is limited to less than one dollar.

Retailers, who must be approved for participation by FNS, deposit the food stamps in their bank accounts after completing a redemption certificate which accompanies the deposit. The banks are reimbursed by the Federal Reserve, which then destroys the coupons and debits the USDA account.

Issuance within a coupon-less EBT system will vary in a number of significant ways from the current issuance process. The coupon-less system will incorporate the same four issuance functions but differences will occur in the last two functions: client identifiers will be contained within (encoded in) the identification card presented by the client or his/her authorized representative, and benefits will be delivered directly at the retail outlet in the form of purchased goods, rather than via coupons.

Significant changes also will occur in coupon supply: requisition, production, distribution, and storage no longer will be required, and client and retailer redemption of food coupons as such will be eliminated. Reconciliation would also be changed: automatic debiting of the client's "benefit account" and periodic/daily crediting of the retailer's account for the value of the sales will occur electronically. Additionally, reporting will be greatly simplified, as many points of loss and error will no longer exist. Exhibits I-2 and I-3 illustrate the food stamp issuance process in on-line and off-line systems. The only primary difference between the two system processes is the client and retailer file updating, which occurs periodically in an on-line system and once a day when an off-line system is in use.

EXHIBIT I-2

AN EBT ON-LINE ISSUANCE PROCESS

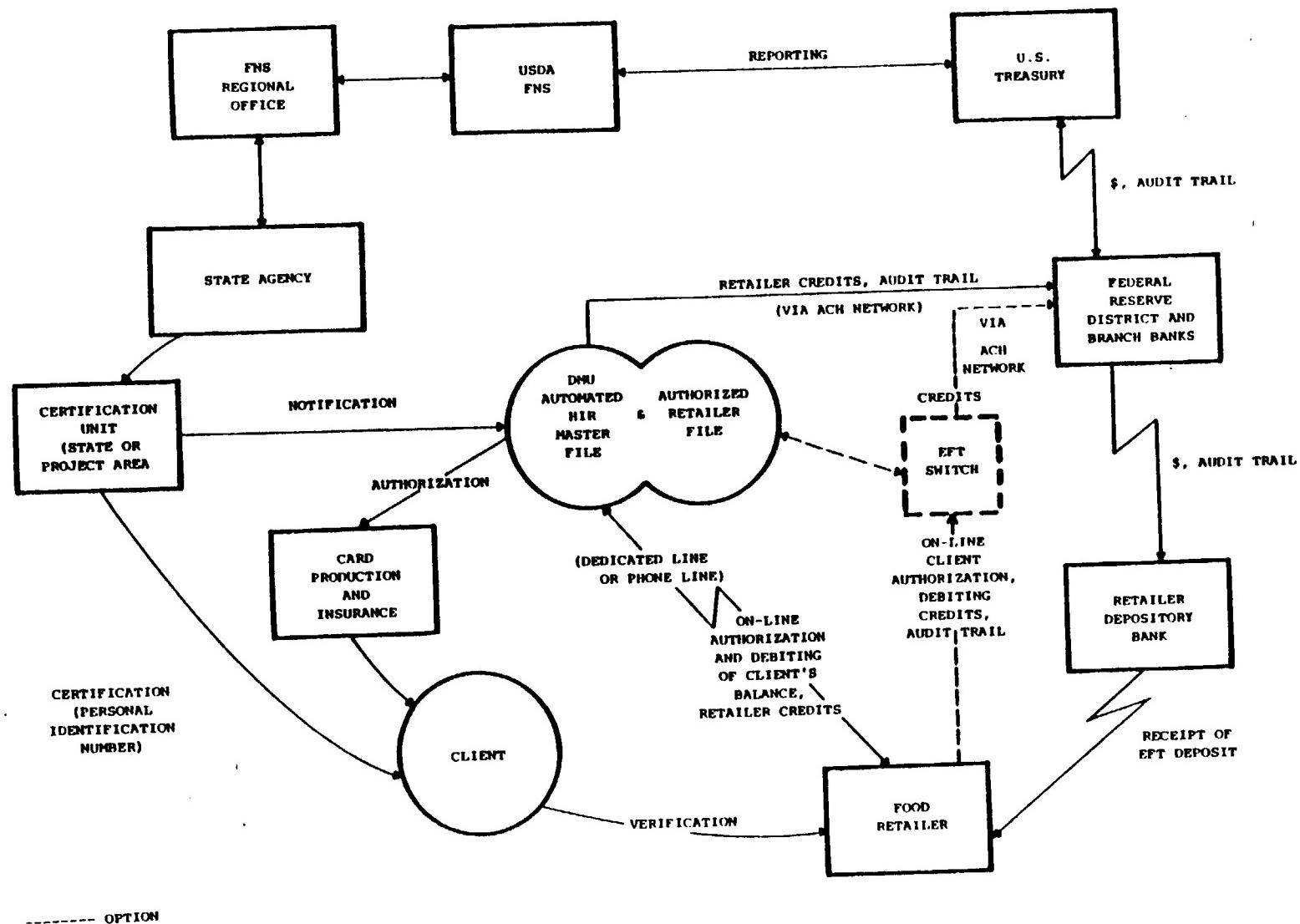
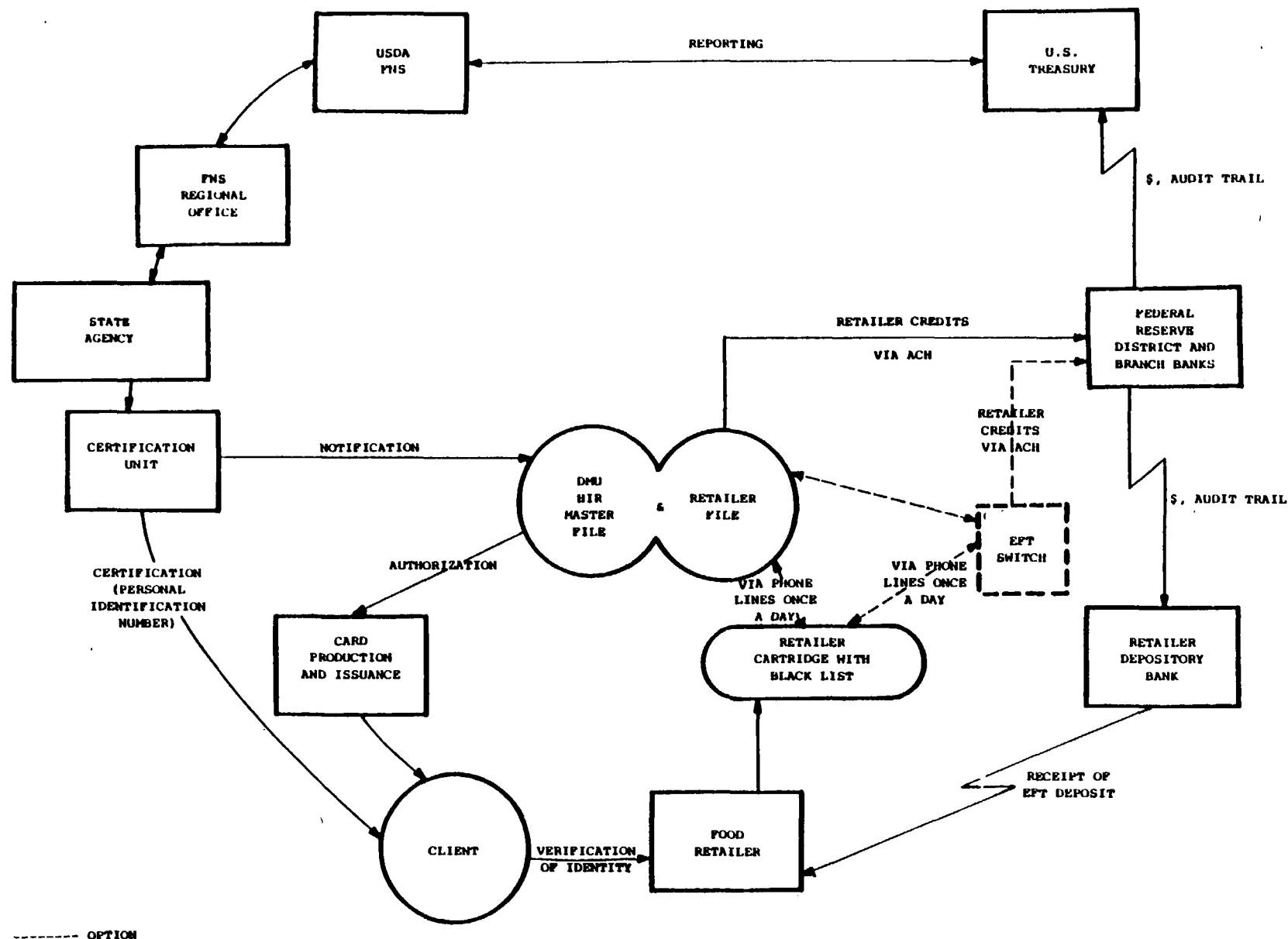


EXHIBIT I-3

OFF-LINE EBT ISSUANCE PROCESS



5. THE REMAINDER OF THIS REPORT PROVIDES DETAIL ON EBT SYSTEM OPERATIONS, COSTS, AND ESTIMATED IMPACT

The next chapter "Characteristics Of An Electronic Benefit Transfer System", describes in detail the characteristics and operations of both the on-line and off-line EBT system approaches. It also describes the basic components of an EBT system regardless of whether it is on- or off-line. The final section of the chapter contains a discussion of the role of food retailers in an EBT system; food retailer acceptance may, in fact, be the critical factor determining the success of any EBT system type tested.

Chapter III, "Potential Impacts Of An EBT System", discusses the estimated impact of the approach on each of the major factors who should be affected by an EBT system. This important chapter also provides estimates of the costs associated with the current issuance system as a basis for comparison with operational cost estimates for the proposed EBT alternatives.

The fourth chapter addresses the technological, financial, and programmatic feasibility of the on-line and off-line EBT approaches. The reliability, accessibility, update capabilities, security, and reporting capabilities of each approach are discussed as part of technological feasibility. Estimates addressing initial capitalization costs and (ongoing) operating costs for steady state systems are presented, and these are broken down for "scenarios" of project areas of various sizes (2,000, 10,000, and 100,000 households).

The final chapter, "Demonstration of EBT Alternatives", presents recommendations based upon study findings regarding steps for testing and demonstration of the EBT concept. The recommendations address the design, implementation and monitoring, evaluation, and competitive processes associated with the demonstrations.

Five appendices are also included in the Report:

- Appendix A: Cost Assumptions
- Appendix B: Industry Representatives Contacted During Feasibility Study
- Appendix C: Glossary of Acronyms
- Appendix D: Addendum to the Feasibility Report—Report on the Smart Card Seminar, March 9 and 10, 1982, Scottsdale, Arizona
- Appendix E: Food Retailer Equipment

CHAPTER TWO

CHARACTERISTICS OF AN ELECTRONIC  
BENEFIT TRANSFER SYSTEM

## II. CHARACTERISTICS OF AN ELECTRONIC BENEFIT TRANSFER SYSTEM

The purpose of this chapter is to present the characteristics of an electronic benefit transfer (EBT) system. The chapter includes a general description of the elements of an EBT system and introduces the approaches under study in this Report.

### 1. AN EBT SYSTEM REPLACES COUPONS WITH ELECTRONIC IMPULSES

EBT systems have the potential to be an alternative to the present food stamp issuance system because of the technological advances in integrated circuits, computer systems, and communication systems in the United States. Years of effort by private sector organizations, including banks, retailers, vendors, and hardware manufacturers have been expended in the development of new technologies applicable to the nation's payment system. These technologies may be capitalized upon to develop an EBT.

In an EBT system, paper food stamp coupons are replaced by electronic impulses as the medium of exchange in the transaction of benefits. These impulses can be transmitted from central files over a communications network linking the files to retail stores or can be literally carried by program participants in a special card which is inserted into terminals at the retail outlet. While an electronic system would represent a quantum leap in technical sophistication over the existing paper-based system, the character of the Food Stamp Program need not change significantly, as discussed below.

In the food stamp life cycle, there are two major types of elements—nodes and flows. Nodes describe the tangible points in the life cycle for people and organizations who interface with the process; for this process the nodes are:

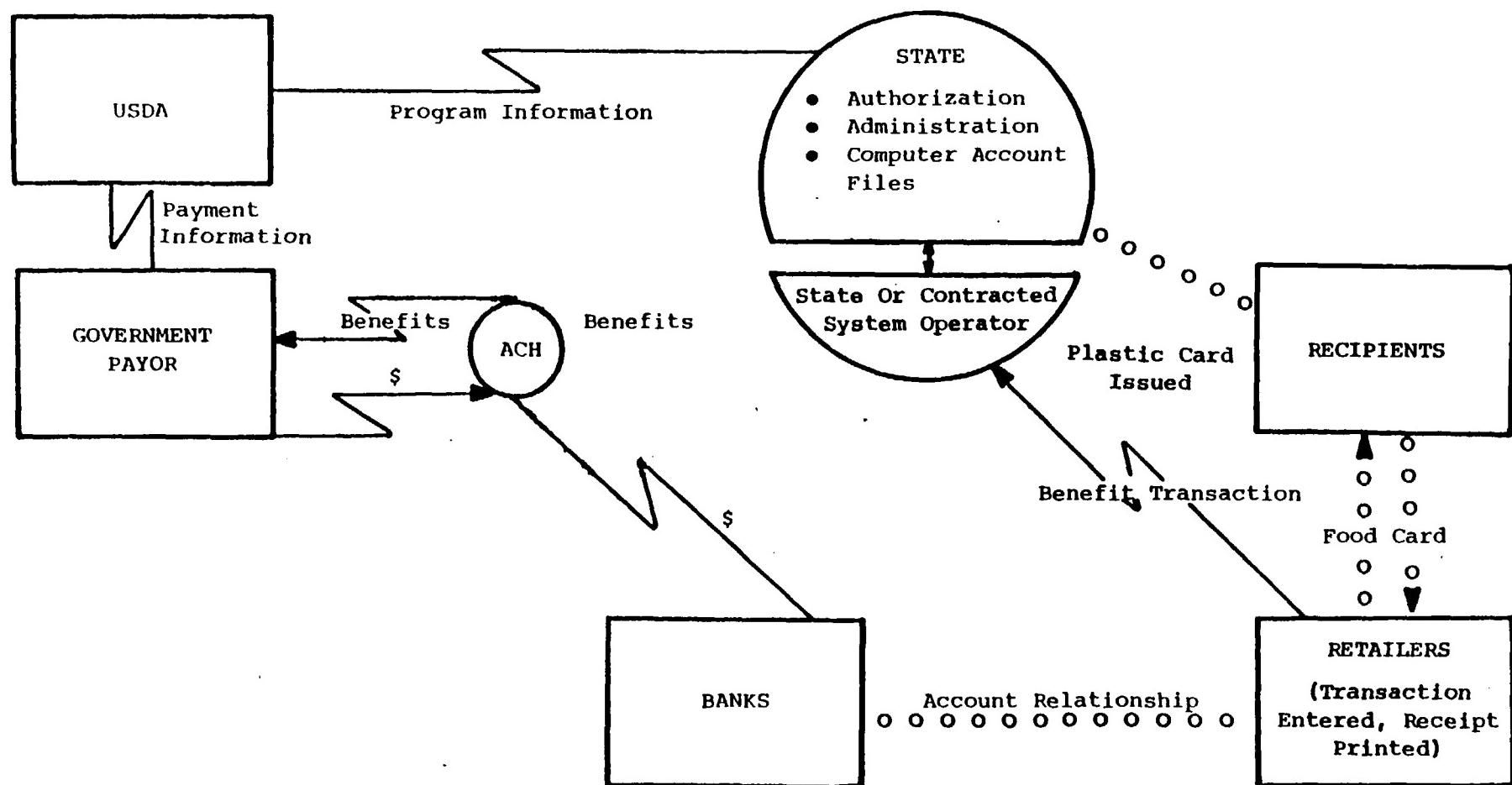
- Clients
- Food Retailers
- Banks
- State or Contracted Issuance Agent
- State
- Government Payor (Federal Reserve)
- USDA
- Automated Clearinghouse (ACH)

Flows describe the benefits and information which passes between the nodes. In the current paper-based system the flows require the actual movement of hard copy documents—ATPs and coupons—whereas in an EBT system the flows are accomplished via electronic communication and transmission.

A graphic representation of the nodes and flows in the Food Stamp program under an EBT system is presented in Exhibit II-1. Electronic impulses replace paper ATPs and coupons as benefit representations in the system. The simplified schematic shows how a State computer generated electronic benefit flows directly to

EXHIBIT II- 1

PARTICIPANTS AND FLOWS IN AN EBT SYSTEM



the retailer or, specifically, his account at the State, when unlocked (accessed) by the appropriate recipient with a plastic card. The benefit then flows at the end of the day through existing communications networks to the Federal Reserve, or another Treasury-authorized institution, to convert the benefits to dollars. In such a system, some type of receipt or report can be generated at each node, thus improving the quality of the audit trails available to assure benefit control.

The potential benefits of the EBT system include tighter security, improved traceability (audit trail), lower cost for processing and administration, and quicker response time. The primary advantage of EBT systems, however, is the elimination of paper as the actual medium of exchange and the reduction in costs associated with handling, protecting, and tracking the documents. Costs associated with a coupon-based system which could be eliminated or lessened include:

- Printing
- Counterfeiting losses (ATPs and coupons)
- Transportation
- Theft
- Issuance
- Error and loss (replacement)
- Redemption
- Float
- Counting
- Cancelling
- Destruction
- Security Maintenance
- Storage

2. THE TWO EBT SYSTEM ALTERNATIVES ARE MUCH THE SAME EXCEPT IN HOW THE CLIENT INTERFACES WITH THE RETAILER TO REDEEM THE BENEFIT

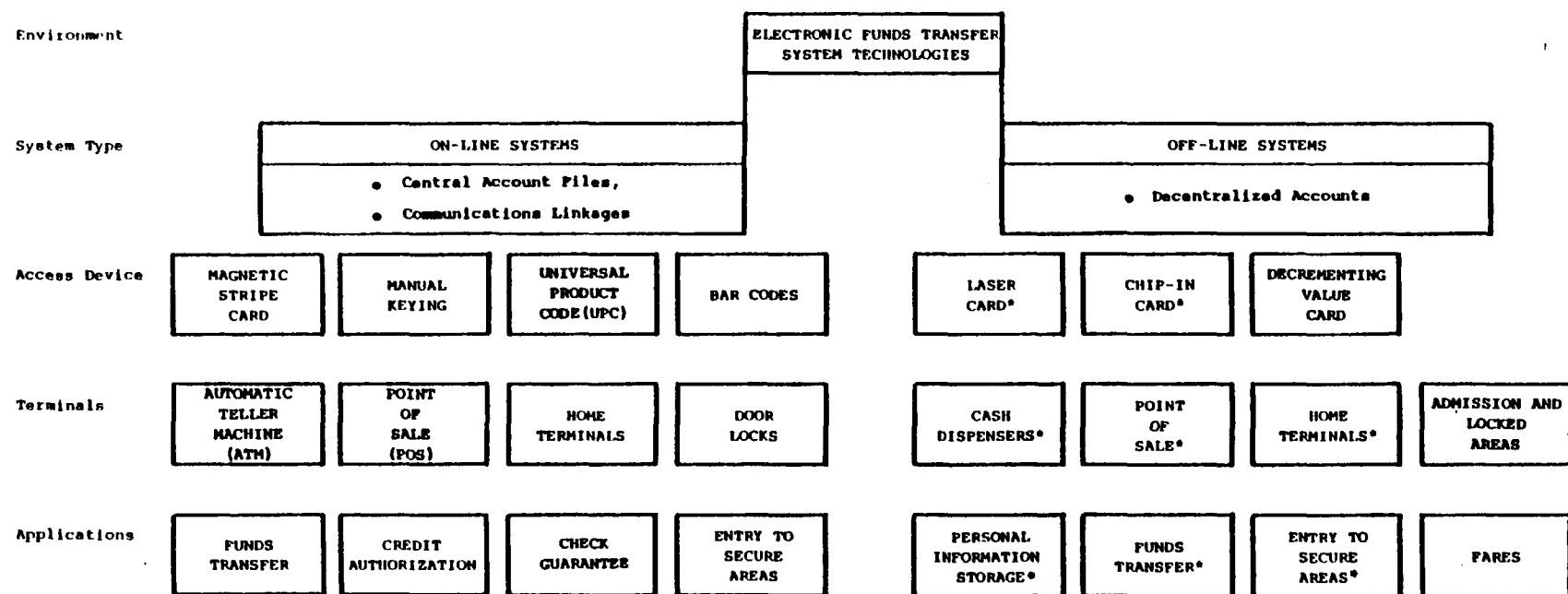
As mentioned briefly in Chapter I, the two basic types of EBT systems studied are the on-line and off-line approaches. Exhibit II-2 shows the types of electronic funds technologies which can be applied to EBT for the Food Stamp Program.

Within the initial branches of the technology tree in Exhibit II-2, on-line and off-line systems represent the generic categories under which specific technologies and applications fall. The on-line/off-line demarcation refers to the actual mode of benefit transfer from food stamp recipient to retailer:

- In the on-line system each retailer is physically linked via terminals and communications lines to a State computer file in which the recipient's benefits are stored. The transaction at the retail location triggers the computer to debit the recipient's benefit account and credit the retailer.
- The off-line approach differs in that the recipient actually carries the value of his benefit with him stored in a tiny microprocessor chip. This chip can be fitted into a plastic identification card which is "loaded" with benefit value from the State computer file. The retailer is equipped with card reader terminals which can, with a high degree of security, debit the recipient's card and credit his own.

EXHIBIT II-2

TYPES OF ELECTRONIC FUNDS TRANSFER TECHNOLOGIES



\* Not yet commercialized

( Exhibit II-3 is presented to further clarify the terms "on-line" and "off-line." Both general system alternatives rely on an on-line computer file of authorized food stamp recipients. In the off-line case the file will be used to install value to be carried by the recipient and transferred to the retailer. In the on-line case, the recipient and the retailer will simply trigger a transfer between the appropriate accounts at the time of transaction. In many ways, therefore, the systems are the same except in the client-to-retailer interface for redemption of benefits.

- The On-Line System--On-line refers to the transaction mode where a State's computer file of food stamp recipients and benefits (its HIR master file) is accessed through an extensive communication network at the point-of-sale (POS) or check-out lane.

Different types of terminals and communications may be employed for different types of stores:

- In a large store, high volume will dictate a dedicated communication line from the store, or from the retailer's data center to the State computer file; in addition, interface with existing retailer equipment such as sophisticated Electronic Cash Registers (ECRs) or scanning systems will be required.
- In small stores with lower volume, a dedicated communication line will usually not be required and no interface is needed with existing store systems; therefore, dial-up transaction terminals would be used. The dial-up terminal would access public communications lines by automatically dialing up the State computer file facility establishing the on-line link on an as-needed basis. The terminal would also have receipt printing and key punch capability.

While the hardware (terminals) would look different in the small store, the process illustrated in Exhibit II-1 for the recipient would be the same. The food stamp client would purchase qualified items by presenting a plastic card which would carry a magnetic stripe encoded with identification information on the back. The recipient or the retailer would pass the card through a magnetic card reader linked to the State computer base. As a security precaution, the recipient may also be asked to enter a pre-assigned personal identification number (PIN) or code word into the terminal. The computer would compare the card and the number to insure the proper person is using it.

The retailer would then send the dollar amount of qualified purchase to the State computer. If the client had a sufficient amount of benefits available, the computer would "take" the purchase amount out of the client account file and place that amount in the retailer account. A receipt would be generated for the client and the retailer. The retailer's bank account would be sent funds at the end of each day through the nationwide automated clearinghouse (ACH) network.

CLARIFICATION OF "ON-LINE" VERSUS  
"OFF-LINE" SYSTEM ALTERNATIVES

EBT SYSTEM ALTERNATIVE		
SYSTEM FUNCTION	ON-LINE ALTERNATIVE	OFF-LINE ALTERNATIVE
Certification Mode <ul style="list-style-type: none"> <li>• Certification</li> <li>• Notification - HIR</li> <li>• Identification Card Generation</li> </ul>	Manual On-Line Or Manual Manual	Manual On-Line Or Manual Manual
Authorization Mode <ul style="list-style-type: none"> <li>• Authorization To Receive Benefits</li> <li>• Receipt Of Access Card</li> </ul>	On-Line Manual	On-Line Manual
Transaction Mode <ul style="list-style-type: none"> <li>• Recipient To Retailer Interface</li> </ul>	On-Line	Off-Line
Settlement Mode <ul style="list-style-type: none"> <li>• Interface To State</li> <li>• Interface To Switch</li> <li>• State To Switch Interface</li> <li>• Switch To Federal Reserve Via ACH</li> <li>• Federal Reserve To U.S. Treasury</li> </ul>	On-Line On-Line On-Line On-Line On-Line	On-Line On-Line On-Line On-Line On-Line

Transactions would not be authorized if the client account had insufficient funds or the card had been reported lost or stolen. The State computer would keep track of all food stamp activity, producing detailed management reports as required by the parties involved in the process.

- The Off-Line System—The majority of development in off-line systems has been undertaken in countries, other than the United States, most notably France. Although several off-line applications have been used for some time (subway fare card systems are one form) the majority of interest for an EBT system is in computer-based off-line systems, the "chip-in-card" or "smart card" technology. The small microprocessor chip used in this technology has numerous capabilities including information storage, value credits and debits, secure identification, and computing power. The card, however, is essentially inert until inserted into a terminal which supplies power and makes contact for accessing information in the chip.

In an off-line EBT system, the month's food stamp allotment would be entered onto the chip from the State on-line computer file via terminals at existing welfare offices. Once the card is "initialized," the food stamp client could use it at retail stores where the POS terminal would take value from the card and transfer it to a retailer unit to store credit in-flows. The client's card would be encoded with transaction information; a paper receipt showing remaining value would be printed. At the end of the day the retailer would "bank" his day's receipts through an on-line process using public phone-lines in order to initiate the redemption process which would result in transfer of dollars to his bank account for the benefit value he had redeemed from clients.

### 3. THERE ARE PRIMARY ELEMENTS OF EBT SYSTEMS WHICH ARE THE SAME, REGARDLESS OF SYSTEM TYPE

The on- and off-line systems have many of the same basic components:

- An automated State benefit issuance file
- Plastic access devices for clients
- Built-in security
- Equipment requirements at the point-of-sale
- Communications and interface requirements
- Information flows

However, there will be many variations within each. These elements are discussed below:

#### (1) An Automated State Benefit Issuance File Is The First Common Requirement

The basis for an on-line electronic system for food stamp program benefit issuance is a central, automated data base or master file containing the amount of client entitlement each month and data to verify the identification of the client. This information must be readily accessible from the retailer's terminal.

Presently, such files exist in some States and are accessed from an issuance office where coupons are transferred to the client.\* These systems could be modified so that access to the file may be accomplished at a retailer location thus eliminating the need for the food stamp coupon. To do this, system software would have to be modified to allow for redemption of the benefit as needed by the client at the point-of-sale and the crediting of the retailer's account. In some States, a large increase in the number of terminals tied to the system to support access to the master file may decrease response time to such an extent that would be necessary to upgrade the CPU or use a front-end processor.

An off-line EBT system also requires that automated client entitlement files be established and maintained. Special terminals located at issuance offices must have access to these files in order to transfer the dollar value of client benefits directly from the State file to plastic access cards. Therefore, an off-line system may not necessitate an increase in the number of terminals tied to the State computer, possibly eliminating the need for upgrading State computer hardware. For daily operations, a "black list" would be maintained in the equipment at the retailers to identify non-active or problem client cards.

(2) Each System Requires That Recipients Have A Plastic Card Access Device

Client access and the security of benefit transfers in either an on-line or an off-line EBT system will be controlled by a plastic card. A variety of technologies are available for consideration in the selection of a plastic access device. These different options include:

- On-line Access Cards
  - Magnetic stripe cards--currently used in credit and debit cards
  - Magnetic ink character recognition (MICR) used on checks
  - Bar codes—Optically encoded, used by various retailers and read with an optical scanner or wand
  - Laser cards—High memory capacity with read/write capability
  - Infra-red cards

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\* The capability for immediate access to information about a client's entitlement exists at present in on-line issuance systems (Florida, Michigan, New Mexico, and New York) but not at the retailer location.

- Vicalloy steel core card—A high density, magnetically encoded card
- Holographic cards—Using holographic technology for decrementing value
- Off-Line Access Cards
  - Micro processors—A tiny chip like those used in micro computers and calculators
  - Decrementing value cards—Magnetically encoded value which is decreased with each transaction; uses read/write technology

The possible combinations of these technologies on a single plastic card expands the alternatives. The technology thus offers different levels of card holder access security and represents different levels of standardization and current industry acceptance. The on- and off-line options are described in more detail below:

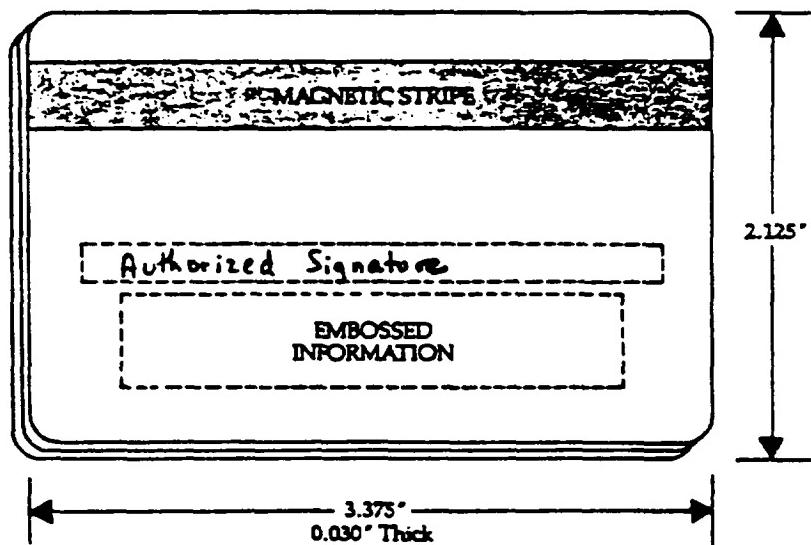
- On-line Access Card—An on-line access card will most likely resemble the estimated 250 to 350 million bank cards used by consumers in the United States today, incorporating magnetic stripe technology as shown in Exhibit II-4.

Over the past fifteen years, standards have been developed at the industry, national, and international levels for the issuance and production of these cards, and for the design and operation of the systems in which they are used. Established standards define the physical specifications of plastic bank cards including embossing and encoding specifications, and the physical and magnetic characteristics for magnetic stripe which specify the data content and format for Tracks 1, 2, and 3 on the card. Magnetic stripe technology allows the recording of information for the automation of transactions in Tracks 1, 2, or 3, or any combination of these tracks. Exhibit II-5 describes the development, capability, content and current usage of each of the three tracks.

The machines which emboss these cards and encode the magnetic stripes cost approximately \$300,000 each and are also expensive to maintain and operate. The machines process from 300 to 1,100 cards per hour, usually under tight security controls. Malco Plastics of Garrison, Maryland, is the leading producer of such encoded plastic cards, with approximately 50 percent of the U.S. market.

EXHIBIT II-4

ILLUSTRATION OF TYPICAL BANKCARD



## EXHIBIT II-5

## MAGNETIC STRIPE TRACKS 1, 2 AND 3

TRACK	STANDARD DEVELOPED BY	TECHNICAL CAPABILITY	CARD DATA FORMAT			CURRENT USAGE
			RECORDING DENSITY	CHARACTER CONFIGURATION	INFORMATION CONTENT	
1	International Air Transport Association (IATA)	On-Line/ Read Only	210 Bits Per Inch (BPI)	7 Bits Per Character (BPC)	79 Alphanumeric Characters	Widespread Usage For Automation Of Airline Ticketing
2	American Bankers Association (ABA)	On-Line/ Read Only	75 Bits Per Inch	5 Bits Per Character	40 Numeric Characters	Widespread Usage For Automation Of Financial Transactions And; Also Used For ID Cards In A Variety Of Non-Financial Systems
3	Thrift Industry	On-Line And Off-Line/ Read And Write	210 Bits Per Inch	5 Bits Per Character	107 Numeric Characters	Not Generally Used. Can Provide Off-Line Backup To On-Line EFT System.

Bar codes, universal product codes, and optical character recognition codes can be added to a magnetic stripe card for flexibility and compatibility to a number of different terminals. However, these codes do not appear to be particularly appropriate for an EBT system. The security of these codes is questionable because they can be easily reproduced in a number of ways.

Drexler Technology Corporation of Mountain View, California, has developed a unique method to record information on a strip of metal and plastic using a small laser. These strip cards are relatively inexpensive to produce and can store more than one million bits of information. The strip, designed to both read and write information, can be affixed to a standard plastic card and can be used in existing ATMs with the addition of a laser read/write unit. These cards have not been produced in mass quantity, nor tested in a pilot demonstration to date.

Other technologies listed earlier, such as infra-red and holographic cards, are in even earlier development phases.

- Off-line Access Card—In an off-line EBT system, a chip-in-card access device would serve as the client's access card. Chip-in-card technology, under development primarily in France, differs significantly from on-line access cards used by U.S. banks today. The microprocessor chip memory can record up to 100 transactions although this memory may be substantially increased in the near future.

The chip-in-cards produced by Cii-Honeywell Bull in France to date are slightly thicker than bank cards used in most bank terminals in the U.S., a contributing factor to the requirement of separate hardware to supply power to the card. While no standards yet exist for the cards, several standards groups, including the recently-formed International Association for Microcircuit Cards, are currently working on the problem. A magnetic stripe may be added to a chip-in-card for additional on-line usage. Manufacturers are also attempting to produce thinner cards; reports of success in this area cannot yet be confirmed.

Other card technologies less advanced than chip-in-cards can be employed in off-line systems. A decrementing value card, similar to the stiff paper Washington, D.C. METRO system fare card, utilizes a magnetic strip encoded for off-line use which would allow the client's card to be updated automatically after each food purchase. While the card is inexpensive to produce and requires no extensive encoding or embossing, it would pose substantial security problems. No identification code is needed to transfer benefits from this card, and it offers no means to verify that the recipient of the food benefits is the authorized client. The lack of durability in the device also limits its applicability.

The common element in each of these technologies is its application to a plastic card access device. While numerous combinations of technologies can be imagined, the long term application of these systems as well as their acceptability within the retail and banking industries is probably the key factor determining their future.

(3) Security Provisions Are Built Into Each System

Security has been one of the key issues over the years in the development of electronic funds transfer systems, and as a result there are a number of security procedures available for use in an on- or off-line EBT system. On-line systems tend to be vulnerable at three major points: the point of system access (card security), the transmission link, the processing point (computer security). Off-line systems are expected to be much less vulnerable at the point of access, while the transmission link does not even exist in the same way as it does for an on-line system; processing security will not differ from that of an on-line system.

The majority of computer systems in use today confine access to the system to those authorized to use it, protect user's programs and data from the intrusion of other users, and protect the whole computer system. In existing POS systems, similar security is now provided. In a point-of-sale EBT, the location where each of the client's transactions occurred and the amount would be recorded as a part of the security of the system.

Thus, the major vulnerability to theft in an EBT system would be through theft of the client's access card. An access card which can be used only with proper identification and/or a personal identification number (PIN) would provide substantial security for the card. This measure would ensure that any benefit could be accessed only by the authorized recipient. If the PIN is stolen as well, security may not be able to be maintained prior to the report of loss of the card.

EBT system design will include the ability to invalidate the lost card immediately to prevent unaided access to the system. Loss, however, would be limited to the individual household allotment. Continued research into security control can be expected; new technologies in card design mentioned earlier offer promise in this area.

(4) Another Common Element Is The Requirement For Equipment At The Point-Of-Sale

Equipment is needed for either system type at the authorized food retail outlet to accept the client's access card, to determine the client's benefit value, to deduct the amount of purchase from this value, and to add this value to the retailer's account. A wide variety of equipment is already in place at retail outlets. Therefore, it is critical that any modifications and

additions made should be compatible not only with the systems in place but also with the food retail environment itself. Specifically this means that EBT equipment:

- Should not take up already limited check-out lane counter space
- Should not decrease store productivity by increasing the amount of time it takes to check out
- Should maximize the use of existing equipment and current procedures used at the point-of-sale
- Should not increase the costs of retailer operations

Equipment requirements for each system type are described below:

- On-line Systems Equipment—The equipment requirements for the on-line EBT system design are summarized below for three types of food retailers:

<u>SIZE</u>	<u>COMPONENTS</u>
Large Store with Scanner System	Fully integrated transaction system with magnetic card reader, PIN pad, printer CPU, and dedicated communication lines
Large and Medium Stores with ECRs	ECR compatible magnetic card reader, PIN pad, printer, dedicated communication lines
Small Stores	DIAL-UP (Transaction) terminals using phone lines, magnetic card reader, PIN pad, optional printer

These requirements are discussed in the paragraphs below.

An on-line EBT system will be most easily accommodated by large grocers who are installing point-of-sale systems dominated by Universal Product Code (UPC) scanner types of systems. The food industry began its UPC development efforts in the early 1970's to increase productivity at the checkstands. Because the costs of these systems have continued to decrease since then, even food retailers with only two or three checkstands per store can now justify UPC scanner systems. These systems are on-line to a store computer which performs financial functions as well as inventory and control functions.

For retailers with this type of equipment, modifications to existing systems would be relatively minor to move to an EBT system. In Iowa, two stores (a Hy-Vee and a Dahl's store) have linked their systems to numerous financial institutions through the Iowa Transfer System. They have equipped each check-out counter in those two stores with a magnetic stripe swipe reader and a small customer keyboard to enter in the PIN. The UPC terminal totals the purchase amount, debits the customer's account immediately, and credits the retailer's account, giving both retailer and customer a receipt.

In small retail stores, dial-up terminals could be used for operating an on-line system. This terminal would have a direct link to the State's master file and would have both print and write capability so both the grocer and customer would have a receipt of the transaction.

Food stamp clients should have the capability of determining their available benefit amounts without making a food purchase. For this purpose a terminal could be set aside in the large grocery stores, at the service desk for instance, for clients to identify the remaining value in their accounts. Or, if the system is piggybacked onto an already existing ATM network, an ATM machine could be used for the same purpose.

- **Off-line Equipment Requirements**—Off-line equipment requirements are the same, regardless of the size of the retailer:

- Card Reader With:
  - .. Keyboard
  - .. Printer
  - .. PIN Pad
- Retailer Cartridge
- Central Store Cartridge (Option For Multi-Check-Out Stores)
- Balance Inquiry Terminal-LED Display

Additionally, the client access card must be used to activate the system. The above requirements are as chip-in-card technology is now evolving. The original off-line concept called for an "interface box" between the client's access card and the retailer's ECR. However, the equipment for this simple approach has not been developed to date.

A chip-in-card terminal must provide the power to read the information contained in the "chip" and to transfer value from the client's card to the retailer's account. A PIN pad, keyboard for food value entry, a printer and a modem must be provided.

The technology has not yet been developed for interfacing existing electronic cash registers (ECRs) and chip-in-card terminals thereby retaining the ECR's features, or the capability to use an existing UPC scanner terminal or sophisticated ECR system with a store computer. This interface will require a substantial investment in the development of interface software but will be invaluable for reducing duplication of equipment at the point-of-sale and obtaining greater retailer acceptance of the equipment. This interface would also provide the ability to maintain complete files of lost or stolen cards and other important information, but only at the medium and large-sized retailers with in-store computer capability. Small retailers with no in-store computer capabilities would have stand-alone units.

Until an interface can be developed to access in-store computer capability, only a partial list of stolen and lost cards can be maintained on a blacklist in the retailer's cartridge. The largest capacity retailer cartridge could hold no more than 2,000 entries, including the blacklist and the retailer transactions. This list would be updated daily via a phone line when the retailer value is transmitted to the State data base or to the EFT switch for crediting to the retailer account.

The off-line system must also provide a receipt to the customer showing transaction value and new account balance. The paper receipt retained by the grocer need only show transaction value. Each retailer will also include a balance inquiry machine separate from check-out readers and accessible before one reaches the check-out.

(5) Communications And Interface Requirements Differ Significantly Between The Two System Types

The requirements for communications linkages and interface requirements between various elements of an EBT system differ significantly between on-line and off-line systems. By definition, on-line terminals at the point-of-sale access a central computer facility for authorization via communications lines and record the transaction on that central file when it occurs; off-line terminals authorize transactions at the point-of-sale without this link.\*

- On-Line System Communication Requirements—Each hardware component in an on-line EBT system must be interfaced to other appropriate components in order to communicate. The computers and terminals of the retailers, banks and State

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\* This concept is illustrated later in Exhibits IV-1 and IV-2, the conceptual designs of on-line and off-line EBT systems.

offices that are linked to an EFT switch require additional software and hardware that will allow data transmitted over communications lines to be received and understood.

- Data Protocols—The format of data in an interchange message is called the protocol. Although it is not necessary for the data in various retailer, bank and state files to be arranged in a like manner, interchange through an EFT switch in an on-line system would be greatly simplified if they were. However, if varying protocols are used at these institutions, protocol conversion software must be utilized at the EFT switch or at each institution's data center. Each different protocol used by an institution in the system requires an additional protocol software program at the switch or data centers for data transmission and communication.

Format differences can be substantial when numerous protocols are used. The software programming and additional costs for hardware for storage of programs and data related to these format differences can also be substantial. Therefore, an effort to standardize protocols when data files are created or to modify existing files may be most feasible.

- Communication Links (i.e., Modems)—A modem (short for modulator/demodulator) is a device which interfaces a terminal to a central computer so that the two can communicate over telephone lines. The communication lines used can be public or dedicated phone lines. If standard telephone and public lines are used, the speed of transmission is substantially slower than when dedicated lines are used. The choice between public and dedicated lines for each modem will depend on the speed of data transmission required.

In a fully on-line EBT system configuration, UPC system terminals and other sophisticated POS hardware would be connected to an in-store computer. This computer may then be linked directly to a central electronic funds transfer (EFT) switch or to the State data base. In a large-scale scenario, a State data center may or may not be included in the configuration between the in-store computer and the EFT switch. The financial institutions of the food retailers and the automated State issuance data files may also be linked to this switch. Because of the high variation in hours of operation at food retailers and the necessity to provide recipient access to food benefits throughout these variable hours, communication links must allow on-line computer time for card holder verification, account inquiry and debit/credit transactions 24 hours a day,

seven days a week. Each of these linkages is provided through dedicated or leased telephone lines. Banks are linked to the Federal Reserve system through existing communications. In this manner, debiting of the Federal Reserve Account, crediting of the retailer's account, and on-line transaction authorization from the State data files are carried out.

In stores with less sophisticated ECR models, equipment may be upgraded and linked on-line for authorization and credit/debit transactions to the EFT switch provided that transaction volume at these stores is sufficient to mandate the use of leased lines. If transaction volume is low, dial-up terminals may be used for authorization and the credit/debit transactions may be handled off-line via tape cassettes or paper updates sent from the retailer to either the EFT switch for data processing or the retailer's financial institution.

Within the food retailer premises, any new EBT system hardware should be interfaced with existing POS hardware. The interface will allow an on-line terminal, such as a magnetic stripe card reader or PIN pad, to communicate with the existing UPC system or ECR terminal. The costs of this interface software will vary with specific terminals, but will be a component of all on-line configurations.

- Off-Line System Communication Requirements—In an off-line EBT system, authorization, credit, and debit transactions occur directly at the point-of-sale through the use of client access cards which carry the benefit balance and various security procedures to verify the card holder. No dedicated phone lines are required at the store level. On-line communication is required only once a day via public phone lines in order to pass client and retailer account information to the State for use in reconciliation, auditing, and investigations, and from there to a switch for crediting the retailer's account.

Special card readers and updating terminals linked on-line to the central computer will periodically transfer the value of the updated client file onto an off-line access card. At the retailers, off-line card readers are not interfaced to existing hardware, as previously discussed. The card reader, however, must have certain features—such as PIN pad, keyboard, and printer—integrated into it or interfaced to it.

4. THE ROLE OF THE FOOD RETAILER IN ELECTRONIC BENEFIT TRANSFER SYSTEMS IS THE PIVOTAL ONE

As long as an EBT system is to substitute electronic payment at the food retail point-of-sale for food stamps, the food retailer must be able and willing to participate in the system. Any system that does not satisfy the needs and demands of the food retailing industry cannot succeed. The issues of greatest importance to the retailer relate to productivity and costs, as discussed below:

(1) Food Retailers Will Not Tolerate Any Diminution Of Checkstand Productivity

Having justified the investments of millions of dollars by the industry during the last several years in UPC scanner systems and many related changes in procedures to improve checkstand productivity, the large food retailer is not likely to tolerate any payment approach that would threaten any of that productivity improvement. In fact, any new payment system at the checkstand may be required to demonstrate further improvement in productivity before it will be acceptable.

In an attempt to increase productivity grocers often separate check cashing and check guarantee services from the food check out process at the checkstand. This service is usually provided at a service desk near the entrance to the store. Current food stamp procedures at grocery stores are similar to cash transactions and not any more time consuming than handling cash. Should new EBT procedures at the check-out lane cause problems or require special handling, large volume retailers might be reluctant to participate. Any transactions which would have to be terminated due to inability to access the State issuance file, equipment failure, or insufficient benefit value, again might affect store productivity, and retailer willingness to use the system.

(2) Several Economic Considerations Regarding An EBT Are Of Concern To Retailers

A number of economic factors of proposed EBT systems are of concern to food retailers. These include: initial costs of equipment and personnel training, the long-run viability of the new systems, a reduction of competition among depository institutions and food retailers, and resolution of errors or breakdowns in the system.

Retailers are currently reluctant for the most part to make substantial capital investment in the purchase of equipment. Some claim that the estimated cost savings, such as a reduction in float and delay time in receiving credit for deposits of the benefit value, are too insignificant to make a perceptible difference to their profit margin, and would not be sufficient to offset an investment in equipment and other systems modifications. This attitude could change if savings could be clearly demonstrated.

Nor are retailers convinced that electronic payment transfer systems have a long-term viability. They may be even less willing to commit themselves to major changes in their current systems for the purpose of pilot testing an electronic food benefit transfer system.

Competition and market forces came into play as well. An EBT system implemented at only one type of retailer location which operates to the disadvantage of other retailers would be unacceptable to the food industry. Many smaller retailers serving the inner cities and lower income populations cannot afford to have their existing share of the market tampered with.

The audit and recordkeeping functions of retailers will change significantly as well. The methods by which errors and breakdowns in the system will be handled as well as the assignment of risk will have to be carefully developed and tested.

(3) There May Be Advantages Accrued Indirectly From An EBT System

In those areas where EFT-POS systems are being developed, or are under consideration, the installation of USDA funded equipment may serve to stimulate other EFT systems. It may also assist some retailers in upgrading their existing equipment. Retailers would be protected from theft of their receipts, and cashiers would be unable to pay cash for the coupons, thereby protecting the store's authorization to participate in the Food Stamp Program. Other, unforeseen advantages may also be identified during a test or system demonstration.

Now that the components of an EBT system have been briefly described, the expected impact an EBT system would have on the participants within the system will be discussed in the next chapter.

### CHAPTER THREE

#### POTENTIAL IMPACTS OF AN ELECTRONIC BENEFIT TRANSFER SYSTEM

### III. POTENTIAL IMPACTS OF AN ELECTRONIC BENEFIT TRANSFER SYSTEM

The degree of impact of implementation of an electronic benefit transfer system will vary among participants depending upon the changes which must be made in their current operations. The impacts may be explicit (e.g., increased or decreased costs, time, personnel, paperwork, etc.) or implicit (e.g., changes in client and retailer convenience or inconvenience or improved public opinion of the program). Advantages and disadvantages, which in the developmental stages may not be quantifiable, will become clearer upon demonstration of an EBT system. The EBT would have an impact on the entire system of food stamp program benefit delivery, not just on the issuance process itself.

The purpose of this chapter is to describe the potential impacts of an EBT system. These impacts are examined below, first in terms of the system and then in terms of the participants within the system.

#### 1. THE COSTS, FRAUD VULNERABILITY, AND ISSUANCE PROCEDURES FOR THE WHOLE SYSTEM OF FOOD STAMP BENEFIT DELIVERY ARE EXPECTED TO BE AFFECTED BY AN EBT SYSTEM

The food stamp benefit delivery process is expected to be affected by implementation of an EBT system in at least three major areas:

- Vulnerability to fraud, abuse, and error
- Benefit delivery procedures
- Costs of coupon production and issuance

These are interrelated in that a reduction in fraud and abuse and a streamlining of the delivery process will affect costs.

##### (1) The Vulnerability Of The System To Fraud, Abuse, And Error Is Expected To Decrease Markedly

Fraud, abuse, and error may be conceptualized as occurring internally or externally to the program. "Internally" means that it involves employees while "externally" in this case refers to non-employees of the Food Stamp Program. The latter term can further be broken down into two categories: clients and Program participants versus non-clients and individuals not dealing with the Food Stamp Program because of their need for the benefit. Introduction of an EBT system is expected to significantly decrease the vulnerability of the food stamp issuance system to all three types of fraud and error.

For example, the elimination of food stamps is specifically expected to reduce the potential for fraud. No longer will food stamps be an alternative currency exchangeable for food items. Because paper is removed from the system there will no longer be trafficking in coupons. Benefit redemption will be restricted to only authorized retailers. Theft of coupons from the mail or from individuals will be eliminated.

The elimination of ATPs likewise will affect the system. The elimination of both theft of ATPs and multiple replacements of ATPs will reduce the costs to the program. It will also reduce costs associated with the reissuance of ATPs and investigations of fraud and abuse. Administrative errors made in issuing coupons and ATPs will be reduced.

Increased automation and the establishment of a central automated data base at the State and project area levels will provide increased capability to verify the identity and authorization of clients to use the benefits. Duplication of clients on the issuance files within a program area or across program areas may also be reduced through the ability of the automated data base to cross-check files with great efficiency. The mystique that the computer holds for those ignorant of its operation may further discourage potential fraud by clients and other participants in the system.

(2) The Benefit Delivery Process Is Expected To Be Streamlined

The currently operating issuance process consists of four major steps, as presented in Chapter I of this report:

- Notification of data management unit (DMU) of client's eligibility
- Authorization for delivery of benefit
- Verification of client identity
- Delivery of benefits to client

While an EBT system will affect each step, the major effects will be in the authorization for delivery and in the actual delivery of benefits to the client. With the exception of the direct mail issuance system, eligible clients now must present themselves to issuance agents monthly to receive the food coupons prior to redemption at the food store, where actual benefits are derived. An EBT system eliminates the current intermediate steps between eligibility determination and actual benefit transfer, resulting in reduced real costs to recipients.

Introduction of an EBT system is expected to eliminate ATP preparation and food stamp coupon printing and distribution; much of the current redemption process will likewise be eliminated. Specific aspects of the current issuance system which are expected to be streamlined include:

- Printing of coupons
- Distribution of coupons
- Bulk storage requirements
- Redemption process of coupons through Federal Reserve system

- Storage/security requirements for coupons and ATPs
- Preparation of ATP cards
- Monthly postage and supplies (envelopes) for
  - Delivery of coupons (direct mail)
  - Delivery of ATPs
- Issuance personnel requirements (for over-the-counter delivery)
- ATP transaction fees
- Reconciliation of ATPs to Master File
- Reporting requirements (FNS 250, 259, 46)

These are some of the areas which could be substantially and directly modified by an EBT.

(3) The General Effect Of An EBT System Is Expected To Be A Reduction in Administrative Costs

The streamlining effect of an EBT system will eliminate entirely a number of costs currently incurred at the Federal, State, and local levels of the Food Stamp Program in the affected areas listed above, and can be expected to reduce others.

Similarly, certain types of "loss" (error, fraud, abuse, and loss itself) associated with the current issuance procedures will be eliminated altogether, although other types of loss may occur or be created from new technologies. In the following paragraphs, current costs and loss figures for the Food Stamp Program are approximated. At this time, there is no way to test these estimates; however, they provide a conservative ballpark estimate of the costs and losses associated with current issuance activities and can be updated as additional information becomes available. These estimates do not specifically address the costs of fraud and abuse within the system; however, many of these costs are currently reported as costs of error and loss; the true costs of fraud and program abuse as such is not known.

(4) Estimated Current Costs Of Food Stamp Issuance Exceed \$300 Million Annually

At the Federal level, issuance-related costs are those for coupon production, distribution, and redemption. The Coupon Production and Redemption

Branch of the Federal Operations Division, FNS, provided the the following estimates for Fiscal Year 1981:

Printing, production, and preparation for delivery	\$33.1 million
Distribution and delivery:	
Storage and distribution	\$ .818
Trucks and postage	2.3
Shipping between warehouses	.3
	<u>3.4 million</u>
Redemption/processing through the Federal Reserve System	7.0 million
Costs of operation of Coupon Production and Redemption Branch, Federal Operations Division, FNS	.1 million
	<u>\$43.6 million</u>

Although it is appropriate to assume that none of these costs would remain as is if an EBT system were in operation nation-wide, nevertheless costs of production of on-line or off-line cards and their distribution would be incurred, although at a much lesser volume. Similarly, redemption costs would be incurred, but in lesser amounts because of the fact that reconciliation (the result of redemption by the retailers) would occur largely computer-to-computer through the Federal Reserve System.

States and localities also incur substantial administrative costs associated with coupon issuance. They report these and other major costs incurred on a quarterly basis using the SF 269 as the reporting format. That form has ten categories (or columns) for reporting costs: certification, issuance, performance reporting system, fair hearing, outreach, training, fraud control, ADP development costs, ADP operational costs, and other. Several of these contain costs related to issuance:

- The "issuance" column (column 2) contains salaries and fringe benefits paid to full and part-time issuance and multifunctional workers for time actually spent on issuance transactions, and contract costs paid to coupon redemption contractors (e.g., banks, post offices, etc.)
- The "fraud control" column (column 7) contains salaries and fringe benefits paid to individuals employed in fraud control activities
- Column 9, "ADP Operational Costs" are those estimated costs related to the ongoing operation of ADP equipment used to support the food stamp program—the salaries and fringe benefits of personnel directly assigned to programming and operating the computer equipment

- "Other" costs, as reported in Column 10, are nonservice or overhead costs including the cost of space and utilities, indirect personnel costs for the salaries and fringe benefits of supervisory, clerical, other support staff, and numerous other related costs

The costs reported on the SF 269 are the claims made by the States to the Federal government for fifty percent of the total administrative costs which matches these costs. In some categories, such as ADP developmental costs and fraud control costs, it is possible that the Federal government pays 75 percent of the costs in that category under certain circumstances, but since this is infrequent, a 50-50 match was assumed for all costs.

In Exhibit III-1, total estimated administrative costs are shown, using the figures reported in Columns 2,7,9, and 10 on SF 269s for Fiscal Year 1981 as the basis. To estimate the proportion of the costs in columns 7,9, and 10 which are applicable to issuance as opposed to certification and other program activities, 35 percent was taken of these column totals. Although this percentage cannot be validated at this time, field work in six States plus cost studies performed by previous contractors lends credence to the figure as a ballpark estimator. Thus the total Federal share of administrative costs for issuance is estimated very roughly at \$129,886,000, or approximately \$260 million, when the State share is added.

Adding Federal food stamp production and distribution cost estimates of \$43.6 million to the \$260 million in administrative costs, an estimate of \$303.3 million is obtained. This figure does not include many significant Federal costs related to issuance, such as those for Regional operations and at FNS Washington. However, the figure provides a basis for comparisons.

(5) Costs Currently Associated With Reported Loss Are Approximately \$37 Million Annually

The value of reported loss and errors occurring in the Food Stamp program can be calculated by using the data submitted on various FNS forms (the 250, the 46, and the 259s) by particular issuance system type: the FNS 46 reports unmatched, duplicate, and replacement issuances in ATP systems; the FNS 259 reports the amount of mail replacements in areas which perform mail issuance; and the FNS 250 reports the difference between the value of coupon disbursed as established by physical inventory of coupons and as established by documentation, the difference between these representing loss to the Program.

Using these reported loss figures, calculations were made of loss/error rate by issuance system type (ATP, mail, and on-line). First, however, the project areas were grouped by size. As seen in Exhibit III-2, Column (5a), the loss/error rate decreases for each system type as the size of the project area decreases and, therefore, the density of population in the project area.

## EXHIBIT III-1

ESTIMATED COSTS OF FOOD STAMP ISSUANCE  
FISCAL YEAR 1981

ADMINISTRATIVE COSTS (STATE AND FEDERAL)			
RELEVANT REPORT COLUMN	TOTAL OBLIGATED*. COSTS	PERCENT** APPLIED TO ISSUANCE	ESTIMATED ISSUANCE COSTS
Col. 2-Issuance	\$ 49,811,446	100%	\$ 49,811,446
Col. 7-Fraud Control	8,647,388	35%	3,026,586
Col. 9-ADP Operational	13,040,647	35%	4,564,226
Col. 10-Other	207,096,426	35%	72,483,748
Federal Share State Match(50 Percent)			\$129,886,006
Total Estimated Administrative Costs			x 2
			\$259,772,012
FOOD STAMP PRODUCTION AND DISTRIBUTION(FEDERAL ONLY)			
Production And Printing			\$ 33,100,000
Distribution/Delivery			3,400,000
Redemption Through Federal Reserve			7,000,000
Coupon Production And Redemption Branch(FNS Washington)			100,000
Total Estimated Production And Distribution Costs			\$ 43,600,000
			*** \$303,372,012

\* As Reported On The SF269 Reports

\*\* Estimates

\*\*\* Does Not Include Regional Office Costs Or Most Federal Administrative Costs

These preliminary figures indicate that the eight largest city project areas (over 100,000 food stamp households each) accounted for 13 percent of total issuance volume and 9.3 percent of reported issuance losses in Fiscal Year 1981. By contrast, 136 medium-sized project areas (average 10,000 households each) accounted for 47 percent of total issuance volume and 50.3 percent of total reported issuance loss. Total reported loss was approximately \$37 million across all project areas and issuance system types in 1981.

Three "scenarios" were created to further breakdown the costs and system losses associated with issuance in the current system. The scenarios include project areas of 100,000 households or more (of which there are only 8), project areas with an average of approximately 10,000 households (numbering 137), and project areas with 2,000 or fewer households (2,778). These findings also are summarized in Exhibit III-2.

- 100,000 Household Scenario

Currently 13 percent of all issuance (dollar value) occurs in eight project areas with more than 100,000 households. Based on the recent GAO estimate of FY '82 benefit level of \$10.6 billion\*, \$1.27 billion in benefits will be delivered to households in this category in 1981. ATP issuance account for 76 percent of the issuance activity in this group (direct delivery was grouped into ATP issuance), on-line for 23 percent, and direct mail for one percent (in Dade County, Florida).

Loss/error rates were determined based upon the most recently reported FNS data (FNS form 250, 46 and 259) for five project areas: New York City; Philadelphia, Pennsylvania; Dade County, Florida; Wayne County, Michigan; and Los Angeles, California. Exhibit III-2 presents the calculations used in estimating annual dollar loss in this category. The \$230,000 figure representing mail replacements may overstate actual mail loss; e.g., some coupons are returned by the Post Office and these amounts are not deducted from the values reported in the 259.

The total estimated loss in this category for FY '82 is \$3.4 million; close to an average of \$425,000 per project area of 100,000 households.

- 10,000 Household Scenario

Nearly half (47 percent) of all dollar value of issuance occurs in project areas of between 100,000 and 2,000 households. Of these project areas, approximately 75 percent use ATP issuance, 23 percent use direct mail and two percent use HIR or on-line systems. Using

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\* Millions Could Be Saved By Improving Integrity of the Food Stamp Program's Authorization-to-Participate (ATP) System, Report to the Secretary of Agriculture by the U.S. General Accounting Office, January 29, 1982.

## EXHIBIT III-2

ANNUAL LOSS/ERROR RATES AND COSTS IN ISSUANCE FUNCTION  
BY PROJECT AREA SIZE

TABLE A

PROJECT AREA SIZE (1a)	ISSUANCE SYSTEM (2a)	PERCENT OF ISSUANCE ACTIVITY (3a)	BENEFIT VALUE (4a)	LOSS/ERROR RATE (5a)	TOTAL LOSS (6a)
100,000 + Household Project Area (8)	ATP Mail On-Line	76% 1% 23%	\$ 965.2MM 12.7MM <u>292.1MM</u>  <u>\$1,270.0MM</u>	.276% 1.8% .0436%	\$2.66MM .23MM .55MM  <u>\$3.44MM</u>  <u>\$425,000/ Project Area</u>
10,000 Average Household Project Areas (136)	ATP Mail Other	75% 23% 2%	\$3,736.5MM 1,145.9MM <u>99.6MM</u> <u>\$4,982.0MM</u>	.219% .91% .016%	\$ 8.18MM 10.4 MM .02MM  <u>\$18.6 MM</u>  <u>\$136,000/ Project Area</u>
≤2,000 Household Project Areas (2,778)	ATP Mail Other	58% 40% 2%	\$2,520.7MM 1,739.4MM <u>96.9MM</u> <u>\$4,357.0MM</u>	.218% .52% .0127%	\$ 5.49MM 8.87MM .55MM  <u>\$14.91MM</u>  <u>\$5,000/ Project Area</u>

TABLE B

## SUMMARY DATA

PROJECT AREA SIZE (1b)	NUMBER OF PROJECT AREAS (2b)	PERCENT OF TOTAL (3b)	ISSUANCE LOSS/ERROR COSTS (4b)	PERCENT OF TOTAL (5b)	DOLLAR VALUE OF ISSUANCE ACTIVITY (FY 82) (6b)	PERCENT OF TOTAL (7b)
100,000 +	8	.3%	\$ 3.44MM	9.3%	\$ 1.3B	13%
10,000 Average	136	4.7%	18.6 MM	50.3%	5.0B	47%
≤2,000	2,778	95%	14.91MM	40.4%	4.3B	41%
	2,922	100%	\$36.95MM	100%	\$10.6B	100%

FNS loss data reported by a sample of fourteen project areas, estimates of annual loss were made. As insufficient data were available, the national mail loss percentage of .91 percent was calculated. Total losses are estimated to be nearly \$18.6 million in FY '82, approximately \$136,000 per project area of this size.

- 2,000 Household Scenario

While nearly 95 percent of all project areas are 2,000 households or less, only 41 percent of the dollar value of issuance can be attributed to project areas of this size. Data on losses experienced by a sample of these project areas were collected. The total loss estimated for all project areas of this size was \$14.9 million, detailed in Exhibit III-2. Individual project average loss is estimated to be slightly more than \$5,000 annually.

(6) Cost Comparisons Of Current And Proposed Issuance Systems Indicates That The EBT System Could Be Less Costly

Any comparison of current issuance system costs to proposed EBT system costs must be approached with caution, given the ballpark estimates of current and proposed system costs. The development of an average administrative cost per household for the current system can be misleading given the wide variations in issuance procedures throughout the states. For comparative purposes, however, such an average is useful. The overall comparison of average cost per household shows that an EBT system would cost less than the current system:

	<u>Current</u>	<u>EBT</u>
Coupon Printing/Distribution	\$5.24	—
Administrative Error/Loss	4.44	—
Operating Administrative Costs	<u>31.24</u>	<u>\$21.31-25.55</u>
	<b>\$36.48</b>	<b>\$21.31-25.55</b>

The cost of card production and distribution is included in the EBT operating costs. EBT error and loss were not estimated because there is no experience to use as a basis for the calculation at this time. The estimated current annual costs of operation, coupon printing, and distribution plus the estimated average issuance system loss, amounts to \$36.48 per recipient household. This compares to a high EBT cost estimate of \$25.55. Detailed financial estimates for EBT systems are presented in Chapter IV and in Appendix A of this report.

2. THE POTENTIAL IMPACTS FOR STATE AND LOCAL AGENCIES FROM EBT IMPLEMENTATION INCLUDE SOME SIGNIFICANT PROCEDURE CHANGES

The current activities of State and local agencies would change in several ways, resulting from the general streamlining effect of an EBT, as described above. The implementation of a full scale electronic benefit transfer system would:

- Eliminate the need for the State and local agency to order, store, protect and transfer food stamps as well as pay a transaction fee for their issuance
- Eliminate the printing of ATPs as well as the printing and stuffing of envelopes in the direct mail systems
- Remove the necessity for the massive manual reconciliation process in an ATP system, involving the matching of transacted ATPs with the HIR master
- Eliminate the problem of key entry errors when the numbers of ATPs produced manually have to be entered into the computer system.
- Reduce mail costs drastically since only the client's access card and perhaps a personal identification number (PIN) would need to be mailed to the client upon certification and not every month as is required of an ATP.

All of these changes, however, are potentially advantageous to the State and local agencies in that costs could be reduced and greater control instilled within the program.

Small project areas seeking to retain local autonomy in program operation may initially object to an EBT system, because initial capitalization requirements may not justify the establishment of an on-line data base or the cost of other system components at the small project level. However, a statewide or regional on-line EBT, while requiring a central on-line data base, would allow the operation and administration of the program to continue at the project area or county level in other respects: a central EFT switch in an on-line EBT system could produce separate management and settlement reports for each program area on a daily basis which could be used for close project area monitoring and control, in an off-line system, these same types of reports would be generated by the State central computer.

The problem of client access to benefits across state lines may raise concerns in an EBT system. However, the EFT switches of several statewide or regional EBT systems could be linked together so that clients could negotiate their food stamp allotment in adjacent states. Out-of-project area client accessibility in an off-line system presents a substantially greater problem.

A potential problem for State and local program administrators is that an electronic benefit transfer system may require significant retraining of current employees to be compatible to the requirements of the new system. Increased computerization increases the need for computer specialists.

A second problem is that the retailer becomes a surrogate issuance agent and the State will need to nurture a closer relationship with the retailers. Clients know that if they have no coupons they cannot buy groceries. However, if the client fails to check his or her balance or there is a systems problem, the retailer becomes an agent of the food stamp program in notifying the client of the absence of any benefit. The dispute between the client and the food stamp program is brought to the retail store and the State may need new procedures to deal with it. Thus, the fraud, and abuse control activities of States are likely to require closer coordination than at present with food retailers.

3. THERE ARE SEVERAL POTENTIAL ADVANTAGES FOR FOOD RETAILERS, BUT THEY MUST BE CONVINCED THAT CERTAIN NEGATIVE IMPACTS WILL NOT OCCUR BEFORE THEY WILL PARTICIPATE

Currently, food stamps are treated similarly to cash at the food retail outlet. Once transacted, they are cancelled, bundled and sent for deposit to the bank. They are guaranteed by the government, so there is no bad check loss associated with them, one advantage over checks. In general, food stamps are widely accepted by food retailers, since the additional costs associated with handling food stamps are offset by their guaranteed redemption value.

The fraudulent diversion of food stamp benefits at the grocery store generally takes two forms: the purchase of non-eligible items with food stamps and the exchange of food stamps for cash. Stores which knowingly participate in these fraudulent activities lose their authorization to participate in the program if the fraud is identified. However, large supermarket chains generally do not participate in these practices as they have large volumes of food stamp business which they do not wish to jeopardize. Additionally, increasing numbers of large stores have UPC scanner check-out equipment which may automatically separate eligible from non-eligible food items. Among medium and small-sized retailers there may be more chance for error in separating eligible and non-eligible items.

Since coupons would be eliminated in an EBT system, retailers could not participate in cash-for-coupon schemes. However, the purchase of non-eligible items where this activity is currently prevalent would not be eliminated because existing equipment is expected to be used to tally food purchases in an EBT system. Overall the amount of reduction of these types of fraud would be relatively small.

(1) The Advantages Of An EBT System For Food Retailers Include Reduced Opportunities For Fraud And Shorter Redemption Time

The advantages to retailers of an EBT system would depend upon the features and cost to retailers of the system. One would expect that once the

system was successfully implemented, the amount of time to check out a food benefit client would be no greater than with the current system. There would be benefits associated with:

- Reduced theft of negotiable currency
- Reduced time in redemption of the food benefit value
- Greater ease in reconciliation.

Food stamp dollars would be credited to the retailer's account within a substantially reduced period of time. If POS equipment for EBT can be utilized for other POS transactions as well, such as for the bank debit cards of other customers, there would be additional advantages to the grocer including reduced costs of bad checks and reduced float, as transactions would be credited to the retailer account within twenty-four hours. The potential benefits of an EBT system would be greater for food retailers having a large volume of food stamp customers than for those who serve only small numbers of food stamp customers.

FNS survey data have indicated that the 8.3 million eligible households account for approximately 21 food stamp transactions (at a total value of \$245) per checkout stand per day when averaged across all types of grocery stores participating in the Program. But some currently participating retailers have very small volume of food stamp activity. Any utilization of POS equipment by other customers which would increase the volume of transactions on the equipment would serve to make the installation of such equipment much more justifiable.

POS equipment which can be used by the majority of customers with bank debit cards and EBT cards could result in significant savings to the retailer, particularly the large retail chains which operate on a one percent or less margin.

To reach a sufficient number of customers to make the system worthwhile, however, the equipment would have to have the capability of taking a number of different bank debit cards. This capability already exists in Iowa where the Iowa Transfer System acts as a shared network for all of the Iowa banks which issue bank debit cards. They are pilot testing EFT at the food retailer point-of-sale in two supermarkets, a Hy-Vee and a Dahl's store.

In New Hampshire a point of sale system has been operating at a cooperative food store for five years. The point-of-sale equipment, on-line to two banks, is not tied into the store's equipment. No charges are made to the store as the equipment has been purchased and installed by the Value Exchange Corporation (VEC), a shared network of banks. The two banks participating in the POS operations pay the network a fee of \$0.25 per transaction. The customer has the capability to make deposits and withdrawals and to pay for groceries on-line from his checking account at the check out lane. The retailer reduces the cost for check services, check losses, and float.

Many Massachusetts and New Hampshire grocery stores have purchased POS, check verification and guarantee services from the network. The retailer pays the network \$.045 for check verification and \$.085 for check guarantee. Eleven supermarket chains have purchased these services from VEC in Massachusetts alone. Until recently Massachusetts law prevented banking in supermarkets. With the change in the legal environment, VEC expects to market more POS systems in grocery stores in Massachusetts.

In most states, a bank's debit card usually has to be used with the bank's electronic equipment. Retailers wanting to use EFT-POS systems would have to have multiple types of equipment for each bank at the check out which is unacceptable. There is a growing trend towards shared networks, a very optimistic sign for increased use of electronic funds transfer at the point-of-sale.

One example of such a shared network is the Dartmouth Network which has very low communications charges. Dartmouth ties into the GTE Telenet packet switching for which customers are charged only for the amount of information sent over the line, not the line itself.

Earlier attempts at implementing EFT at the point-of-sale were credit card oriented with the major credit card companies charging 1.4 percent and more for this service. For retailers operating on a very low margin, the additional costs of EFT did not offset the benefits.

(2) Potential Disadvantages Of EBT Systems For Retailers Reflect Their Concerns About Productivity And Equipment Costs

The disadvantages of an EBT system for food retailers relate to the costs of equipment and integration of that equipment into their existing systems, specifically regarding

- The size and space required for the equipment
- The possible decrease in productivity
- The long-term viability of the EBT system and its associated hardware and software
- Assurances that payment will indeed be made through the system

Incentives to obtain retailer participation in an EBT system must focus on these issues and must demonstrate that there will be cost savings to the retailer resulting from EBT. Otherwise, it can be safely predicted that food retailers will not be willing to share in the costs for setting up a system to eliminate food stamp coupons.

4. THE POTENTIAL BENEFITS FOR THE FOOD STAMP CLIENT ARE SUBSTANTIAL

(1) Advantages For The Client Include Much Greater Ease Of Use Of The Benefit And Decreased Worry About Benefit Loss

If the implementation of an EBT system does not decrease the number of retail stores participating in the program, there is expected to be a significant increase in the convenience of access by the legitimate client to the food stamp program. An on-line EBT system allows client files to be updated automatically, and accessed by a card issued when a client is added to the program. No longer will the client have to travel to, or wait in line at, the distribution center every month for ATPs or food coupons. Once the plastic card is in the hands of the client, food stamp benefits will be available as close as the nearest authorized retailer during the operating hours of the grocery store. This will serve to increase access to the system and decrease transportation costs incurred in traveling to the distribution center.

Once the access card is in the hands of the client, there is little worry every month that the benefit might be lost in the mail since the client's allotment is updated automatically in the State's automated data base. In an on-line system, the allotment becomes available at the retail store. Benefits are transferred directly to the client's card at selected locations each month in an off-line system. In neither case is a mail system used after initial card distribution.

(2) Potential Disadvantages For Client Can Be Avoided If The Balance Available Is Checked Before Shopping Begins And If There Is Adequate Training On Card Use

A foreseeable major problem for the client as well as the store clerk, will be having groceries rung up on the cash register only to find that no benefit is available. This will provide an embarrassment to the client. This problem is remedied as long as the client remembers to check his balance at an inquiry terminal, if one is available, before entering the check-out line.

In addition, if EBT is not in operation universally, the food stamp client may find him or herself being singled out for special treatment. The food stamp recipient, therefore, becomes conspicuous. However, the client may not be entirely unaccustomed to this, despite the best efforts of FNS, some banks and issuance points have special lines for food stamp clients.

Potential problems exist in getting the client accustomed to the new procedures; i.e., checking the balance prior to shopping, and keeping the new card in a safe place. Indications are that the use of a credit card type access device may not be a problem. Photo identification cards and magnetic stripe cards used in on-line issuance systems have been well received

by store customers generally since they provide the necessary verification of identification for cashing checks. However, a problem may arise if the client is required to have a personal identification number (PIN) which may be easily forgotten or misplaced if stored on a piece of paper. The use of word codes for PINs may remedy this situation.

5. BANKS AND OTHER VENDORS WOULD BENEFIT FROM AN EBT SYSTEM BY STREAMLINING THEIR FOOD STAMP-RELATED ACTIVITIES AND POSSIBLY BY INCREASING VOLUME FOR THEIR OTHER EFT SYSTEMS

Banks sometimes play two roles in the current Food Stamp Program: one as contractors in the actual issuance of coupons, and one as the depository of benefits for retailers. Since a fully electronic system would, by definition, eliminate paper coupons, banks and other contractors with their established procedures for handling paper tender would no longer have that activity to perform. This, of course, would be a cost savings for those States who pay transaction fees to issuance contractors. On the other hand it would deprive these contractors of this particular revenue stream. However, the adoption of an EBT system might create a new role for banks as issuance contractors.

Financial institutions are active in eliminating paper from their own payment operations and many already have in place the elements of electronic funds transfer systems. The majority of these systems currently are on-line and include elements similar to Food Stamp EBT such as: magnetic encoding and issuance on-line files, communications lines, transaction and communication switching software, electronic terminals (ATMs and POS), information reporting, and settlement. The similarity in EBT system requirements and banking EFT systems brings up the concept of "piggybacking."

Piggybacking simply means tying into and using the banking industry's systems capabilities which are already in place on a pay-as-you-go basis. Such sharing occurs often in the banking industry; extensive networks have developed in recent years on this concept. Because on-line systems are so expensive and retailers have demanded that any system brought into their stores serve the majority of their customers, many banks and other financial institutions are sharing the systems and the costs. Usually separate corporate entities are set up, sometimes by banks, sometimes by third parties. Over one hundred such shared systems exist today.

Within the last year, moreover, technological and organizational advances have allowed nationwide shared networks to develop and experience tremendous growth. The national and international organizations of VISA and MasterCard are two examples of this, but as many as twelve other organizations are currently attempting to gain nationwide coverage via various approaches. These organizations include: Automated Data Processing (ADP), A. O. Smith Data Systems Division, Rocky Mountain BankCard System, Applied Communications, Inc. (ACI), NCR, American Express and Decimus Corp. An important point is that although many of these organizations can support POS through communications and distributed processing capabilities, most of their efforts are currently directed to linking Automated Teller Machines (ATMs).

Shared networks on a local, State, or nationwide level could be the new issuance contractors vying for transaction fees in an on-line EBT system. If private sector networks continue to develop as expected, State and Federal governments could avoid many of the costs associated with the initial capitalization of an on-line system and in fact could spur the growth of these networks with food stamp transactions and fees. To some extent a similar scenario could develop with off-line systems as banks or even other government welfare agencies with similar needs could help carry the initial cost and contribute to high transaction utilization.

The other role of banks as settlement mechanisms for converting coupons to dollars in retailers' accounts would change for the better in an EBT environment as far as banks are concerned. In an EBT system, costly aspects of acting as a pass-through agent for coupons will be eliminated, including: handling, counting, cancelling, storing, and transferring. Even more attractive however, may be the reduction of float time. Currently it can take up to a month between the time a bank receives coupons, processes them, passes them on to "the Fed," and receives real dollars. Conversely, the Government will have to make good on benefit values in less time, sacrificing some of the existing time value of the money it currently enjoys.

Banks in an EBT environment will receive dollar value from the government for their retailer customers. This will probably be accomplished using the existing automated clearinghouse network (see Exhibit III-3) which can be accessed once a day by either the State computer file or the private sector network operator to key government payments to banks for the appropriate retailer. In the off-line system alternative, it is conceivable the banks will also serve retailers by accepting the cartridges on which the day's food stamp benefits received are stored. The bank in this case would need a "smart card reader" (SCR) and could then pass the credit through the existing ACH network to the government for payment and deposit to retailer accounts. If banks assume the role of receiving and reading retailer cartridges to facilitate payments, they should also be linked to the State to facilitate updating and reporting of information concerning the program as a whole, specific aspects of the program and individual clients. Such an audit trail is necessary for program administration as well as investigations.

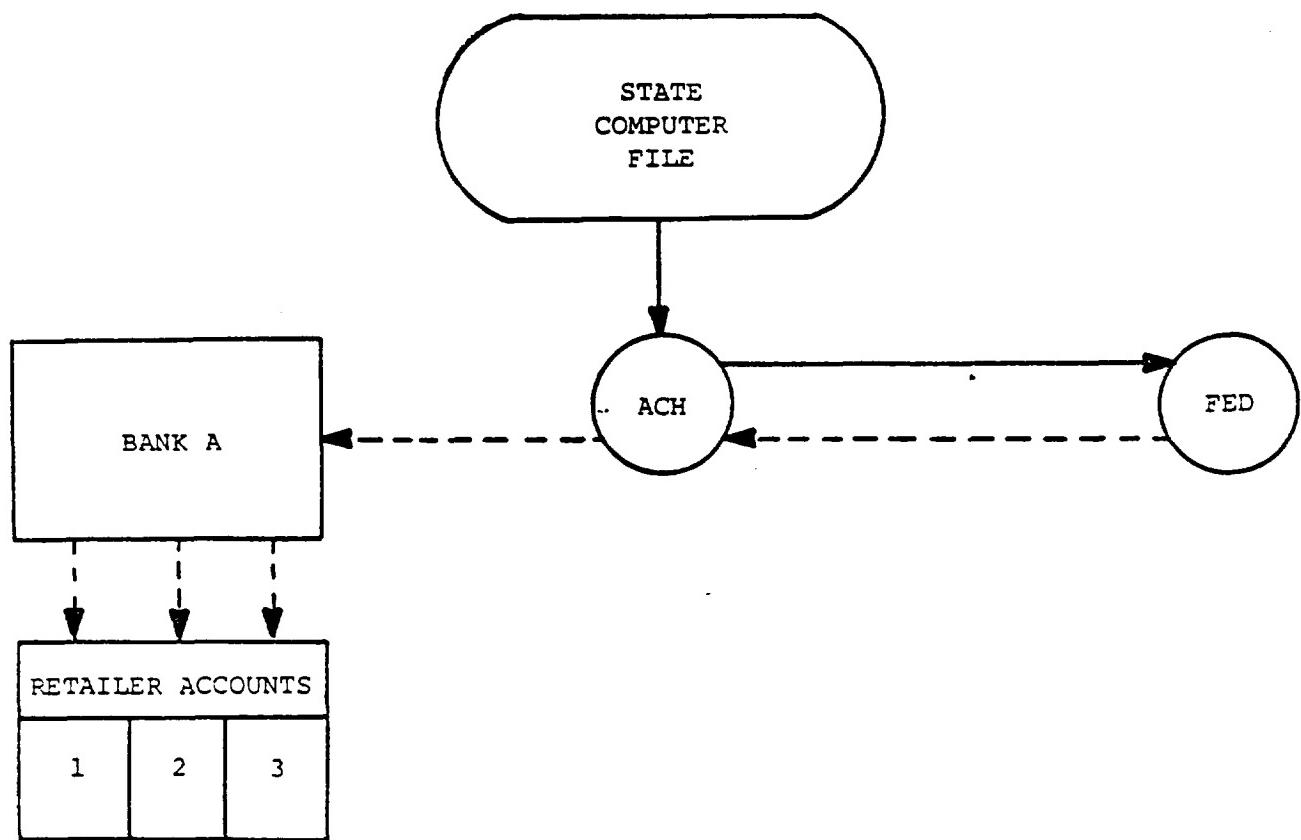
## 6. THERE ARE POTENTIAL IMPACTS FOR THE FEDERAL RESERVE BANKS FROM EBT IMPLEMENTATION

### (1) The Federal Reserve Plays An Important Behind-The-Scene Role In The Food Stamp Program

The primary responsibility of the Federal Reserve Banks is to function as the central bank of the United States. In this role, they perform many non-monetary functions for the Department of the Treasury, which is the governmental entity in charge of receiving, keeping, managing and disbursing the public funds supporting the Federal portion of the food stamp program. Thus, the Federal Reserve Banks are involved with and affected by the present food stamp distribution and collection system and would be affected by any proposed changes therein.

EXHIBIT III-3

ACH NETWORK LINKS TO  
RETAILERS AND FED



There are twelve Federal Reserve District Banks and twenty-five subordinate branch banks in the system. The central monetary policymaking body, the Board of Governors, and its staff reside in Washington, D.C. Each of the district banks operates independently with its own management structure. Each district and branch bank is organized somewhat differently. Varying degrees of automation exist throughout the system. Each of the twelve district banks maintains its own accounting system which is independent of other district banks accounting systems.

These differences in organization, automation and accounting systems are significant and must be borne in mind by the Food and Nutrition Service when it plans demonstrations of electronic benefit transfer. FNS officials must remember they are dealing with twelve or more separate entities and each affected unit must be contacted for its own cooperation. While all districts will cooperate with FNS demonstrations, some are better positioned than others to assist the Service. The Chicago, Atlanta and Dallas staffs are larger relative to sister banks and, since they do not have the food stamp volumes found in New York and Los Angeles, are in a better position to support demonstrations than the latter banks.

An EBT system will impact upon the Federal Reserve System because electronic funds transfer and administrative messages are communicated between system banks through the Federal Reserve Communications System (FRCS). (An enhanced communications system, called FRCS-80, is under development.) The district banks also operate all the automated clearing houses (ACHs) except for the New York City ACH, which is run by the New York Clearinghouse Association. Electronic funds transfer between the Treasury and the Federal Reserve are provided via a connection between the New York Federal Reserve Bank and the Department's Washington base. Administrative communications currently go through the Treasury Automated Communications System (TACS) while bulk data moves through the mails.

The district and branch banks are deeply involved in the current redemption and reconciliation systems employed to account for food coupons. Incoming deposits are received from the commercial banks via four typical means:

- First class mail
- Registered mail
- Delivery by messenger
- Together with the check shipments sent via messenger or courier

All of these shipments are at the commercial bank's expense since even check shipments are now fee-charged under the Federal Reserve's new pricing policies.

All incoming deposits of food coupons are verified—one dollar denominations by sampling and larger ones by actual piece count. Coupons are handled in the banks' cash areas since their size, condition, quality and lack of MICR encoding do not blend with the high speed processing of checks. After the coupons are verified they are cancelled and destroyed with immediate credit passing to the commercial banks. Reports are sent to the Treasury and to FNS. The Federal Reserve charges the Treasury and FNS for this operational support but no money actually changes hands. The process is a bookkeeping function since the Reserve System returns a yearly investment yield to the Federal government net of any operating costs such as food coupon program support. For example, in 1980, the redemption costs of processing coupons through the Reserve Bank System amounted to approximately \$7 million (latest available figures).

One final operating point should be noted. Counterfeiting of food coupons is considered to be a problem, with New York and Los Angeles as the two most significant problem areas. The inspection for counterfeits is performed on a sampling basis and, when bogus coupons are detected, credit is denied to the commercial bank which sent the coupons. If provisions for credit had been granted, a charge back is made to the bank's account.

(2) Although An EBT System Would Fit Well With The Federal Reserve's Processing Procedures, It Might Represent A Loss Of Income To The System

Changes required of the Federal Reserve would be relatively minor if an electronic benefit transfer system were to be initiated. At the present, the district banks and branches have invested in certain specialized equipment (Brandt, Inc.) to verify, endorse, and destroy the food coupons. This equipment is similar in manufacture to other Brandt items used to count currency or destroy spent bills. However, the Federal Reserve is undertaking a modernization of its currency counting and destruction machines by introducing new Recognition Equipment, Inc. (REI) machinery which will provide an on-line counting and destruction capability. Thus, the Reserve bank's operating mode is actually changing and the elimination of food coupons would more nearly fit this new operating role than would retaining paper documents.

At the present, the Reserve banks view their contributions to the food coupon program as providing a redemption service and a value transfer mechanism in keeping with their position as the Nation's central bankers. The \$7 million estimate for coupon redemption costs in 1980, derived from the System's internal cost accounting program (PACS), is a mixture of fixed and variable costs and would not represent a total savings if food coupons were to be eliminated. Federal Reserve staff officials have historically urged the elimination of paper coupons so that the resources devoted to handling these items could be assigned to other primary activities. As a result of The Monetary Control Act of 1980, which required the Federal Reserve to begin implementing a fee schedule for its services, the System's check clearing volumes have declined. Somewhat ironically, this reduction in potential fee income makes coupon redemption services, at a \$7 million cost per year, financially more attractive than an EBT system where fees income would be substantially less, as illustrated in Exhibit III-4.

## FEDERAL RESERVE SYSTEM CHARGES TO USDA

Comparison of charges by the Federal Reserve System to USDA/FNS under the present food coupon program with a proposed electronics benefit transfer system. Based on the 1980 figures taken from the FRS/PACS cost accounting report. (Pages 70-73)

CATEGORY OF EXPENSE	CHARGES FOR COUPON BASED SYSTEM (\$ MILLIONS)	CHARGES FOR EBT SYSTEM (\$ MILLIONS)
Personnel	3.283	0.821
Supplies	0.112	0.028
Equipment	0.063	0.021
Shipping	0.180	0.000
Communications	0.029	0.029
Miscellaneous	0.008	0.008
Data Processing	0.100	0.400
Floor Space	0.520	0.130
Planning	0.011	0.011
Maintenance On Equipment	0.131	0.013
Subtotal	4.437	1.461
Long Range Studies	0.062	0.062
Overhead	2.640	0.871
TOTAL	7.139	2.394

On balance, it appears that the Federal Reserve and, ultimately, the Food and Nutrition Service would benefit from a reduction in operating costs associated with the elimination of paper based food coupons. Variable costs would disappear and some older, dedicated machinery could be retired. Personnel could be distributed to more profitable, higher priority, services or released. According to Federal Reserve System officials (see Exhibit III-4), approximately \$4.8 million of FRS charges to FNS could have been eliminated in 1980 if an EBT system had been operating.

If the Federal government remains as the principal funding agent, the Reserve banks will be able to utilize the strengths of its new communications service called FRCS-80. This state-of-the-art communications network will support three major application areas:

- Funds Transfer
- Bulk Data Transfer
- Administrative Messages

This capability will be a mainstream service in contrast to food coupon handling, which is an ancillary for most Reserve banks and branches.

#### 7. POTENTIAL IMPACTS FOR USDA

The major impact of EBT for USDA will be the removal of the cost of food stamp production, transportation to the States, the cost of maintaining storage and security over the food stamp coupons, and reduced charges from the Federal Reserve System. If implementation of EBT produces a trend towards State-operated systems rather than county-administered systems, EBT will allow increased uniformity in the conduct of the food stamp program within States. While the writing of the software, the interfacing with the retailers, and the hardware configurations would probably differ among States, each State would be performing issuance in a similar way. At present, the methods for issuing food stamps are many and varied, essentially in States where the food stamp program is county-administered. In addition to uniformity, EBT will increase the accountability of each State.

Problems may exist for USDA since there will be an increase in the need for ADP specialists to review and monitor the EBT systems. These problems may already exist where on-line issuance systems may be evaluated by management evaluation personnel with little ADP background. Part of the problem of evaluating ADP systems with non-ADP personnel is that apart from some difficulty in understanding the operation of the system, computer hardware may be blamed for errors caused by bad system design and programming.

CHAPTER FOUR

FEASIBILITY OF AN ELECTRONIC BENEFIT  
TRANSFER SYSTEM

#### **IV. FEASIBILITY OF AN ELECTRONIC BENEFIT TRANSFER SYSTEM**

The purpose of this chapter is to provide detailed information about the technological and financial feasibility of the EBT system alternatives for the Food Stamp Program. It builds upon the system descriptions presented in Chapter II and provides additional technical detail about operations and costs to support the discussions in Chapter III.

##### **1. A SUMMARY OF THE FINDINGS OF THE FEASIBILITY STUDY IS PROVIDED HERE**

Findings regarding the technological and economic feasibility of the two EBT system types are discussed in this section, first, in an overall statement and, then, by system type.

###### **(1) Findings On Technological Feasibility: Both System Types Have The Potential To Meet FNS Needs In An EBT System**

###### **• Overall**

- It appears that both the on-line point-of-sale system and the off-line system for electronic benefit transfer have the potential for technological feasibility in the Food Stamp Program.
- Of the two systems, only the on-line point-of-sale approach has been implemented and proven to be technologically successful in the U.S., with a wide variety of applications and retailer types, including check guarantee and authorizations and automated teller machines. A prototype on-line point-of-sale installation in two food stores in Iowa, and a 5-year old POS-EFT system in a New Hampshire food store are two known food retailer applications with direct relevance to an on-line EBT system.
- The off-line system, as represented by the chip-in-card technology, has technological promise; however, it is to a great extent an undeveloped and untried technology.

###### **• On-Line**

- Technologies to meet EBT requirements including terminals, communications, computer hardware and software are currently available.
- Elements of the on-line system, including hardware and software, are available from more than one vendor.

- Previous experience of the private sector with on-line systems will significantly facilitate the integration of technical components into a system for the electronic transfer of Food Stamp benefits.
- An on-line system for electronic benefit transfer in the Food Stamp program can take advantage of the private sector on-line, point-of-sale technologies and systems currently in-place or under development through "piggy-backing."
- On-line systems appear to have high reliability with substantial redundancy built in to assure continued operations, a result of years of development and implementation experience.
- On-line systems can be used only for retailers with a permanent location and access to public or dedicated communications equipment. Retailers without permanent locations or telephone access would require special arrangements outside of the on-line EBT system or would have to be excluded from the Food Stamp Program.
- In an on-line system, the security of cards, transmission lines, and computers of the system can be protected through a variety of existing methods. However, while the on-line system will eliminate many types of fraud and theft associated with current coupon issuance systems, new types of computer related fraud and theft may be introduced.
- Given the state-of-the-art of the on-line, point-of-sale technologies, demonstration activities could begin within a relatively short time frame—approximately one year.

- Off-Line

- Several problem areas with off-line system technology for the chip-in-card are currently unresolved, particularly with the equipment necessary for operation of the system in a food retail environment.
- The chip-in-card is a major focus of research and development efforts. However, standards have not yet been adopted and planned offerings by vendors are very different. Other off-line technologies may have potential but are in even earlier stages of development.

- No off-line chip-in-card system similar to the food stamp application is currently in use in the U.S.
- It is difficult to predict whether the off-line, chip-in-card technology will be used in retail payment applications in the U.S. due to the private sector's current level of investment in and satisfaction with on-line systems.
- Once chip-in-card technologies have been tested in a retail POS environment, reliability of an off-line system is expected to be about the same as an on-line system except that there will be considerably less reliance on telephone lines for communications. The provision of back-up methods to allow operation of the system in the case of malfunctions will involve extensive effort.
- The off-line system may be used by virtually any retail outlet, including those with non-permanent locations, because of the "stand-alone" nature of the hardware and the independence from the telephone system. However, units with built in power supplies have not yet been developed.
- Given the state-of-the-art of the off-line technology, a demonstration of a complete system is unlikely for at least two or three years.

(2) Findings On Economic Feasibility: The On-Line "Piggybacked" System Appears To Have The Lowest Operating And Capitalization Costs

• Overall

- Of the two on-line system approaches\* and the off-line system examined, the "piggybacking" on-line system had the lowest estimated cost for initial capitalization per household for each of three scenarios: \$98.55, \$42.05, and \$14.95 per household for scenarios of 2,000, 10,000, and 100,000 households respectively. The off-line system was more expensive with estimated costs of \$182.00, \$150.24, and \$97.29 for each of the three scenarios.

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\* The two on-line approaches are the "piggyback" system which would be reliant upon the electronic networks in use by the Nation's financial institutions, and the "State standalone" system, which would not involve this reliance.

- For operating costs the piggy-backing on-line system was the least expensive of the three scenarios with costs of \$58.61, \$32.61, and \$21.31 per household for 2,000, 10,000, and 100,000 households respectively. The off-line system was again more expensive with \$77.14, \$42.45, and \$25.55 per household for the three scenarios.

- On-Line

- Most development costs of on-line technology have already been borne by the private sector.
- Initial capitalization costs can be greatly reduced if shared with private sector via piggy-backing.
- Operating costs per household for the on-line system are estimated to be less than both the current issuance costs (including losses) and the off-line system costs.
- Availability of multiple vendors may encourage price competition in equipment.

- Off-Line

- Development costs of system would have to be borne by the Food Stamp Program or by the system vendors as no other retail payment application is currently anticipated in the U.S.
- It is uncertain as to how many vendors would be able to participate in the system; dissimilarity in vendor offerings for the near to mid-future may effectively eliminate price competition for system components.
- Operating costs cannot be shared with other parties in the retail environment and will be higher than the on-line system.

2. DETAIL ON THE TECHNOLOGICAL FEASIBILITY OF EACH SYSTEM TYPE FOLLOWS

Technological feasibility of an EBT system addresses the hardware and software designs, compatibility with existing systems at various food retailer locations, and communications lines. Other system requirements examined were: reliability, accessibility, file updating and maintenance, security in terms of the access card, transmission link and computer security, and information reporting.

The following discussion of technological feasibility focuses first on on-line systems and secondly on off-line systems.

(1) The On-Line Point-Of-Sale Alternatives Are Discussed First In Detail

Existing on-line point-of-sale alternatives were examined to determine the technical feasibility of an on-line EBT system which would be modeled in many respects after the existing systems. Of all the types of electronic systems possible, the most technologically mature one is on-line point-of-sale, first implemented nearly 15 years ago in Bellevue, Washington. Initially a failure, it eventually was converted into one of the most successful shared ATM networks in the country, soon to be nationwide.

- On-Line Systems Are Widely Accepted By Retailers For Credit Card And Check Authorizations—Today there are thousands of on-line terminals in stores across the country used for check guarantee and credit card authorizations. A significant number are located only at customer service windows, especially in the case of food stores. However, many are located at checkout stands at general merchandisers, clothing stores, book stores, etc.
- On-Line POS-EFT Experience At Food Retailers—Electronic payment transfer exists at the food retailer point-of-sale in only a few locations. A fully integrated on-line POS debit card system is operating at all check-out stands in one Dahl's and one Hy-Vee store in Des Moines, Iowa. This system uses magnetic card readers and PIN entry pads tied into the stores' NCR scanner system terminals and then to the Iowa Transfer System, Inc. (ITS), a communication switch. ITS in turn is tied into the computer account files of nearly every bank in the State. It facilitates transfers of funds and settlement and produces detailed management activity reports. Mr. Robert Hand, President of Dahl's, reports: "The system works great. It increases throughput, decreases bad check losses, and may someday eliminate the threat of robbery because there won't be enough cash in the store to want to steal." A similar POS-EFT system has been operating in a New Hampshire cooperative food store for over five years. Customers with bank cards can make checking account deposits, withdrawals, and pay for their food at the check out stand. The retailer pays nothing for this system. Banks pay the network which installed the system \$0.25 for each transaction. The system, unlike that in Iowa, is not integrated with the retailer's ECR but is completely separate. Nor does it have printing capability. Instead, the ECR receipt is rubber stamped to indicate transaction as an EFT transaction.

- On-Line EBT Applications—Food stamp benefits must be available at many types of stores and, certainly, the extensive and expensive system in Iowa would not be suited for all types of stores. However, less expensive technology exists for medium and small stores. For the reason mentioned in previous discussions of retailers, (i.e., the traditional low food store margins and the historical credit card orientation of plastic cards) EFT-POS is feasible and has been proven in other types of retail stores.

For stores equipped with Electronic Cash Registers (ECRs), on-line systems can be tied directly into many vendors' ECRs. For most of these terminals, the store clerk enters the customer's card number into a key board; however, a PIN pad and magnetic card reader can be fitted to the machines for customer entry of the PIN. Companies like NCR can and will soon be building such capability into their machines.

The ECR terminal scenario is in place for on-line credit card authorization and guarantee in numerous places in the country. One of the most successful programs is that of Maryland Switch, Inc. which processes approximately 1,000,000 transactions a year.

- On-Line Dial-Up Terminals For Smaller Stores—For smaller stores with low volumes and no electronic cash register system, the on-line approach can be quite simple. Instead of having a dedicated communication line between the data base or switch and the store, an existing telephone line is used. The Dial-up or Transaction phone terminal accesses the data base account files by automatically dialing the appropriate computer. The terminal has a magnetic card reader, a key board for PIN entry, and in some models has a receipt printer.

The small store on-line POS approach with a credit card orientation exists in many areas of the country. The most significant is the VISA POS program, which through a distributed processing network of 32 IBM Series 1 mini-computers, is driving approximately 17,000 credit card authorization terminals nationwide. The largest processing participant to date is the Rocky Mountain BankCard System which has over 1,000 terminals in place or on order. While the VISA terminals have no printer or data capture capability, the dial terminal POS system could be easily adapted to food stamp program requirements.

- Summary Of On-Line EBT System Components By Food Retailer—The components of the on-line EBT system design are summarized below for the three types of food retailers:

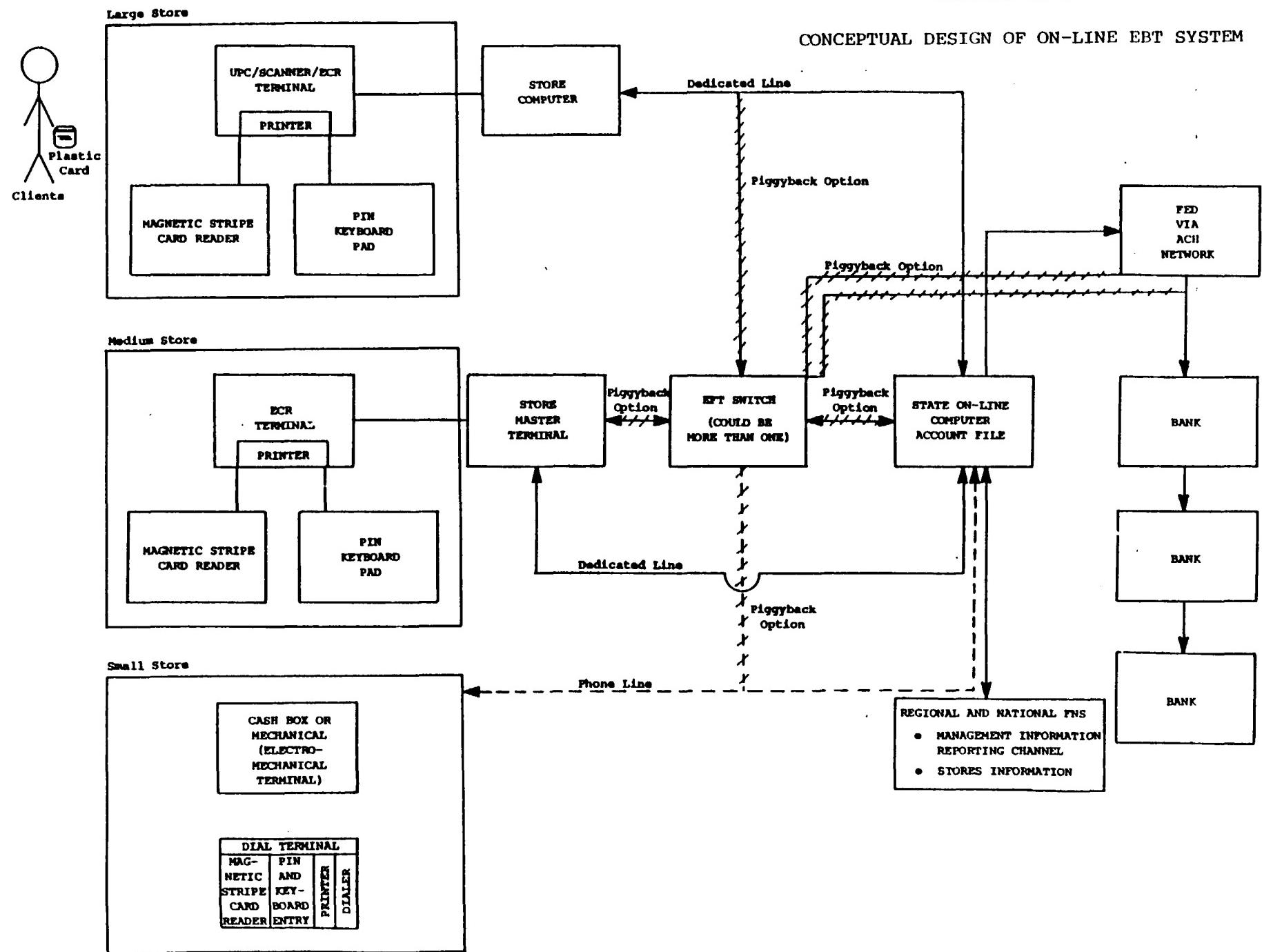
<u>SIZE</u>	<u>COMPONENTS</u>
Large Store with Scanner System	Fully integrated transaction system with magnetic card reader, PIN pad, printer, CPU, and dedicated communication lines
Large and Medium Stores with ECRs	ECR compatible magnetic card reader, PIN pad, printer, dedicated communication lines
Small Stores	DIAL-UP (Transaction) terminals using phone lines, magnetic card reader, PIN pad, optional printer

A schematic of the hybrid on-line system is presented in Exhibit IV-1. The exhibit introduces a new element, the EFT switch. The communications for funds flows and information flows of an EBT system are very similar to those of the private sector EFT payment systems for debit cards. For the bank customer the debit card directly accesses a bank account just as the Food Stamp card would access a benefit account.

- Role Of The EFT Switch In POS Systems—The EFT switch is the key component to the shared private sector networks discussed at the beginning of this section. As these networks continue to grow, more retailers will have POS terminals because more of their customers will have debit cards. In fact, it is becoming more common to see retailers establishing their own ATM and POS networks and offering banks a chance to participate.
- The EFT Switch Link To State Data Base—The EFT switch receives the impulses from all terminals in the network and routes them to the appropriate bank or data center which holds the customer's account. The State food stamp computer file can be tied into the switch just as banks are. When a recipient uses a terminal the switch will identify it as a food stamp client and make the connection between the retail terminal and the State. The EFT switch would allow the State to lease existing terminals and communications on a transaction by transaction basis. If no one EFT network serves all the retailers who will be accepting food stamps, the State could tie into more than one network or could actually place some terminals and charge for their use by private sector organizations.

EXHIBIT IV-1

CONCEPTUAL DESIGN OF ON-LINE EBT SYSTEM



The on-line technologies which would be employed in the design of an on-line EBT system are successfully implemented in numerous configurations today. The remainder of this assessment of the technological feasibility will be directed to the specific requirements of the food stamp program.

- Reliability—Since their inception over a decade ago, on-line systems have become considerably more reliable thanks to technological advancements and refinements in terminals, computer hardware, software, and communications. Networks of thousands of on-line terminals today experience over 98 to 99 percent "up-time." Redundancy or (back-up) is built into the systems so that if the main computer goes down for routine maintenance or because of a problem, the account file data base can be copied onto another unit.

While building reliability into computer operations through duplication is possible due to the low cost of memory, the same is not true for communications lines and store terminals. Having two lines into every retailer is simply not cost effective given existing high reliability rates. As for terminals, a broken machine will cause a problem only at small stores as larger stores will be able to rely on units at other check-outs.

Problems with communications or terminal malfunctions, though rare, could cause extreme retailer and customer inconvenience if it occurred during a peak store time. Therefore, a back-up mechanism must be developed to handle down time without compromising the systems integrity. Several options or a combination of options could be employed including:

- A paper voucher written out by the store clerk with the purchase amount and client card number. One copy of the voucher would go to the client, one to the store and one to the State
- An emergency phone number to the State data base which could be called when the terminal or dedicated line is down. Personnel in the State computer center would check the client balance and authorize the purchase of food up to a set limit as is done with credit cards today. This puts a hold on the authorized amount of food benefits in the State data base. The checker then writes in the amount of purchase up to the authorized amount on the master terminal receipt. The actual amount can then be entered into the State data base when the system is back up. This would prevent the client from overdrawing the food benefit balance at another store as would be possible if authorized balance was not put on hold.

If there is an electrical failure in the store, all customers would be inconvenienced as the store operations would be shut down. Food stamp clients would be treated similarly to all other customers.

- Accessibility—An on-line system can be implemented at any retailer with a permanent location and accessed by any food stamp client with an active magnetic stripe card during store operating hours. A problem is encountered, however, when the retailer does not have a permanent location, such as is the case with milk routes and vegetable stands. One solution other than that of eliminating these vendors from the program is to issue script to clients who know they are going to use their food benefits at these locations. Since such vendors represent less than 2-1/2 percent of the total food stamp outlets and only one percent of total volume, the script could be turned into a State office which would issue a check to the pre-approved vendor.

Accessibility to recipient balance information can also be handled in the on-line system. As in access to benefits, balance inquiry may take different forms in different size retailers. In all types of stores, balances and the next benefit issuance date can be printed on receipts. This information should be available without having to go through the checkout line. In small stores the POS terminal can be used for this purpose. In medium and large stores a special terminal can be set aside to read cards and display balances. A growing number of large stores around the country already have or plan to install automatic teller machines (ATMs) to provide cash to their customers. These could be used for balance inquiries if the State is tied to the network switch which controls the machines' operations.

- File Updates—The on-line system at point-of-sale complements the on-line State computer data base. Client and retailer files are updated at the time of transaction; however, real money, is only exchanged periodically, probably once a day. Clients' cards can be activated or deactivated using CRT terminals at the State facility. Due to the high turnover in recipient roles, cards will probably be set to zero balance and flagged during periods of inactivity instead of being removed from the account file. This will ensure the process and reduce costs of card issue and data entry associated with clients who go on and off the roles several times a year.

Since the State computer is linked directly to on-line terminals, the State will have control over authorized stores as well. Terminals can be given or denied access to food stamp files via a simple update. This capability is of special importance if the State is "piggybacking" on a private sector network which serves non-food stamp retailers.

- **Security**—One of the key issues in EFT, security, is constantly on the minds of those people developing and operating on-line systems. For this reason there are many security procedures available and more being devised. The integrity of an on-line POS system is vulnerable at three major points:

- The point of access (card security)
- The transmission link
- The processing point (computer security)

While the sophistication of an EBT system vis-a-vis the current paper-based system will eliminate many of the fraud and abuse problems associated with coupons, the potential will still exist to defraud the program. Therefore, security must be a major aspect of the system. Some of the more established techniques for assuring system integrity are worth mentioning.

- **Card Security**—Numerous methods are available to assure that the correct person is using the access card. The most cost efficient and accepted method relies on possession and knowledge, using a Personal Identification Number which only the intended client knows and can enter into the POS terminal for comparison by the computer. The most common application of this method is with ATMs. The card can be further secured by using signatures and photo IDs. The EBT application introduces a unique situation relative to the ATM, that being that any member of the household may need access to the benefits or a non-household member may do the shopping. One way to avoid having the household PIN known by too many people is to restrict use to one or two people who can be indicated on the card with dual signature authorizations.

Because access cards with standard magnetic stripes can be read and duplicated relatively easily, PINs, photos, signature verification, or some other security technique must be built into the EBT system.

- **Transmission Link Security**—Wire tapping constitutes a level of criminal fraud that is not currently experienced in the food stamp program. If it is not addressed EBT will certainly attract its share of electronic burglars. Wire tapping is not physically difficult: "spoofers" or imposter terminals can be linked to transmission lines and accounts can be debited and credited in ingenious ways. The primary countermeasure is cryptography which employs codes and ciphers to jumble transmissions and decode or decipher once the transmission is received. The National Bureau of Standards as well as most hardware vendors offer encryption algorithms to minimize transmission

crime. In the case where the State "piggybacks" on existing shared networks, such security will be in place. In a State-capitalized EBT system, this type of security must be created.

Computer Security—Computer fraud is not an area to be taken lightly in EBT. Although a vast array of techniques are available to protect data and software, invariably it seems that only with experience can the system be made secure. Two general categories of computer security are prevention and detection.

- Information Reporting—An on-line computer system can capture, retrieve and process information with relative ease. Compared to the manual systems still used by some States, EBT provides an opportunity to make the entire food stamp program more manageable and efficient. Additionally, the communication link between all the nodes, or participants, in the network will allow information which has never been available before without painstaking manual reporting to be gathered, correlated, and analyzed.

In EBT, data can be captured at each point in the food stamp life cycle as well as at the State computer. Receipts can be printed wherever needed, for clients, retailers, banks, or government agencies. The software driving the State computer, and the network switch in the case of piggybacking, would provide management reports on client use, retailer volume, daily activity account reconciliation, settlement costs, and any other facet of the operation required. The uses of this information are limitless and specific inquiries can be made from the system as needed.

One of the more interesting applications will no doubt be in investigation. Cross checks with other data bases will be facilitated and certain suspicious behavior by clients or retailers can be "flagged" for special attention. This power to access information may precipitate some interesting questions relating to the Freedom of Information Act which allows consumers certain rights concerning computerized files. Many States and the Federal government also have legislation relating to EFT which may require attention in an EBT system.

## (2) The Off-Line System Is Described And Analyzed

The chip-in-card technology under study for appropriateness to EBT use is still in various stages of development and testing. Other off-line alternatives, currently in use for very specific purposes or under development, were also examined. These included technologies such as the decrementing

value card, laser cards, etc. Many of the security features necessary for an EFT-POS system were lacking, however; therefore, these alternatives were not considered feasible for an EBT system.

- Chip-In-Card Development—The term "chip-in-card" refers to a microprocessor computer chip which is inserted into a plastic card for use in numerous applications including payment systems. These cards are also called "memory cards", "cartes a memoire", "smart cards", "intelligent cards", "microprocessor cards", and "portable checking account cards".
  - French Government Is The Major Supporter Of The Chip-In-Card—Today, chip-in-cards are being produced by several companies in France, Germany, Italy and the United States, mainly for experimental purposes. Much of the development, testing and international promotion of chip-in-card technology, however, is due to the efforts of a consortium of government agencies, banks, retailers, and manufacturers in France.

Since 1975, the French government has invested over \$27 billion to modernize France's telecommunications network and to merge telecommunications with data processing to form a national program called "Telematique." This large-scale project encompasses the development and testing of chip-in-cards and peripheral hardware for a variety of applications including home transactions, security access, drivers licenses, medical records, and payment cards.
  - First POS Chip-In-Card Tests To Occur In Mid 1982—The investment represents the first substantial commitment to the development of a comprehensive EFT banking system in France, on-line or off-line. The potential reduction of the current cost of check handling to French bankers, approximately \$1.00 per check, offered by the chip-in-card is one of the reasons this technology has been widely promoted in France. POS applications of the card are planned to be tested in mid-1982 in three French cities and will be implemented by one of three French chip-in-card manufacturers. A committee of the Postal, Telephone and Telecommunications Ministry (PTT), and a group of

large French banks have designed the test specifications and selected the suppliers. Information on these tests is provided below:

CHARACTERISTICS OF PLANNED TESTS OF  
INTELLIGENT CARD IN FRANCE, 1982

<u>City of Test</u>	<u>Number of Cards</u>	<u>Number of POS Terminals</u>	<u>Supplier*</u>
Lyon	50,000	200	Flonic, a subsidiary of Schlumberger
Caen	50,000	250	Philips Data Systems
Blois	20,000	200	Cii-Honeywell Bull, 47% owned by Honeywell, U.S.A.

The purpose of these tests is to permit a full assessment of the various approaches adopted by the suppliers. This is intended to result in a recommended chip-in-card standard which is then likely to be adopted for national implementation in France.

- U.S. Interests in Chip-in-Card Technology—Chip-in-card technology represents a divergent transaction mode from the on-line technology broadly adopted by U.S. banks and retailers. U.S. financial institutions and government agencies continue to monitor the French developments and to investigate various applications possible for smart card technology.

U.S. bankers have expressed concern that the French-developed chip-in-cards are not technically compatible with existing EFT terminals and systems or standard encoding and embossing machines in the U.S., which have cost the banking industry billions of dollars to develop and operate.

The American Bankers Association (ABA) is currently examining the issues related to chip-in-card development and trying to identify potential applications within U.S. banking today of the smart card. The ABA is also participating in a working group at the International Standards Organization (ISO) to develop standards for the chip-in-card.

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\* Other major suppliers which have developed prototype cards but are not included in these demonstrations include Siemens of West Germany and Marcel-Dassault of France. Card development in the United States is at a much more primitive stage than is true for these European-developed prototypes.

First Bank Systems, a five-state bank holding company based in Minneapolis, Minnesota, has scheduled a home banking test for 1982 where in-home terminals will be accessed by chip-in-cards. This is the first and only chip-in-card demonstration yet to be announced in this country.

The Chase Manhattan Bank is evaluating prototype cards and terminals supplied by Cii-Honeywell Bull, one of the three French companies to be involved in the French POS tests later this year.

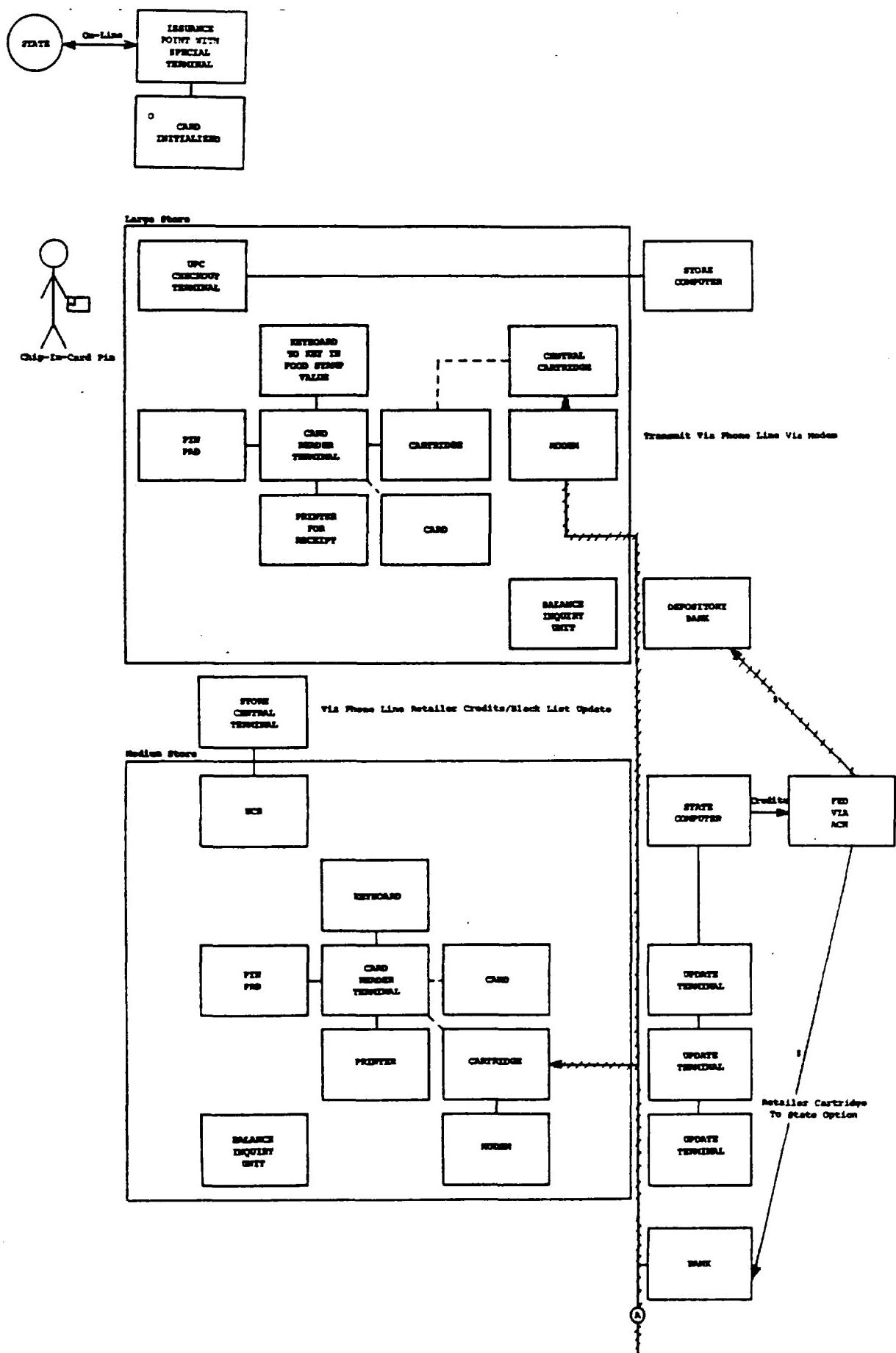
- Conceptual Design Of A Chip-In-Card EBT System—Since both the French and American chip-in-card technologies have yet to be demonstrated in a pilot test, the feasibility of the scenario put forth in this Report cannot, and is not, based on empirical study. Rather, it is the result of an analysis of technical, economic, and programmatic requirements of an EBT system, and an investigation of the U.S. food retailer, banking and EFT environments and currently available information of developing chip-in-card technologies.

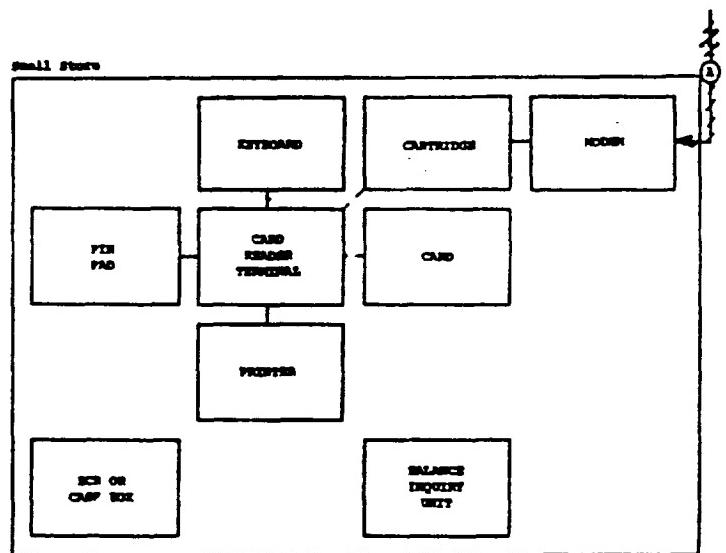
The conceptual design of a chip-in-card scenario is provided in Exhibit IV-2 which illustrates the relationship of the various EBT system elements: chip-in-cards, food retailers, banks, the Federal Reserve System, and the State automated data base. A matrix correlating type of retailer with systems requirements is shown in Exhibit IV-3. A discussion of the technical operation of each of these elements follows.

- Initialization of Chip-in-Card—In this off-line EBT system, each authorized client will be issued a chip-in-card access device and corresponding PIN from the State issuance office. At this point of issuance, the card is "initialized" by a special terminal which transfers benefit value on-line from the automated State issuance files directly to the card's memory. This will also hold pertinent card holder identification information and confidential codes for verification, and store data relating to each benefit redemption transaction.
- Chip-in-Card Features—The memory capacities of prototype chip-in-cards produced to date vary by manufacturer with the majority of memories storing from 2,000 to 8,000 "bits" (binary digits) of information. These bits, represented by 0s and 1s, are combined in sequences to represent numeric or alphabetic characters or words called bytes. On average, the card's memory capacity will record approximately 100 transactions before a new card must be issued.

EXHIBIT IV-2(1)

CONCEPTUAL DESIGN OF CHIP-IN-CARD EBT SYSTEM





Note: This system configuration is based on existing prototype systems designed in France.

## EXHIBIT IV-3

## FOOD RETAILER AND SYSTEM REQUIREMENTS

TYPE OF RETAILER	EXISTING POS EQUIPMENT	OFF-LINE CHIP-IN-CARD EBT SYSTEM REQUIREMENTS AT POS	OTHER REQUIREMENTS
Large	<ul style="list-style-type: none"> <li>● UPC System Scanners</li> <li>● Store Computer</li> </ul>	<ul style="list-style-type: none"> <li>● Client Access Card</li> <li>● Card Reader With: <ul style="list-style-type: none"> <li>- Keyboard</li> <li>- Printer</li> <li>- PIN Pad</li> </ul> </li> <li>● Retailer Cartridge</li> <li>● Central Store Cartridge (Option For Multi-Check-Out Stores)</li> <li>● Balance Inquiry Terminal-LED Display</li> </ul>	<ul style="list-style-type: none"> <li>● Automated State Data Base</li> <li>● Cartridge Readers At Bank</li> <li>● Certification, Updating, And Reader Terminals At Issuance Offices</li> <li>● Dedicated Lines From State Terminals To State Data Base</li> </ul>
Medium	<ul style="list-style-type: none"> <li>● ECR</li> <li>● Store Computer</li> </ul>		
Small	<ul style="list-style-type: none"> <li>● ECR</li> <li>● Cash Box</li> </ul>		

Increasing the amount of memory in the chip is seen by manufacturers as a key element to making the chip-in-card more useful. Two methods of increasing memory are currently under development. The first involves producing a more powerful chip (i.e., more bits of memory). The second is the dual chip card, where the first chip carries identification and PIN information and allows access to a second chip dedicated to value and transaction storage.

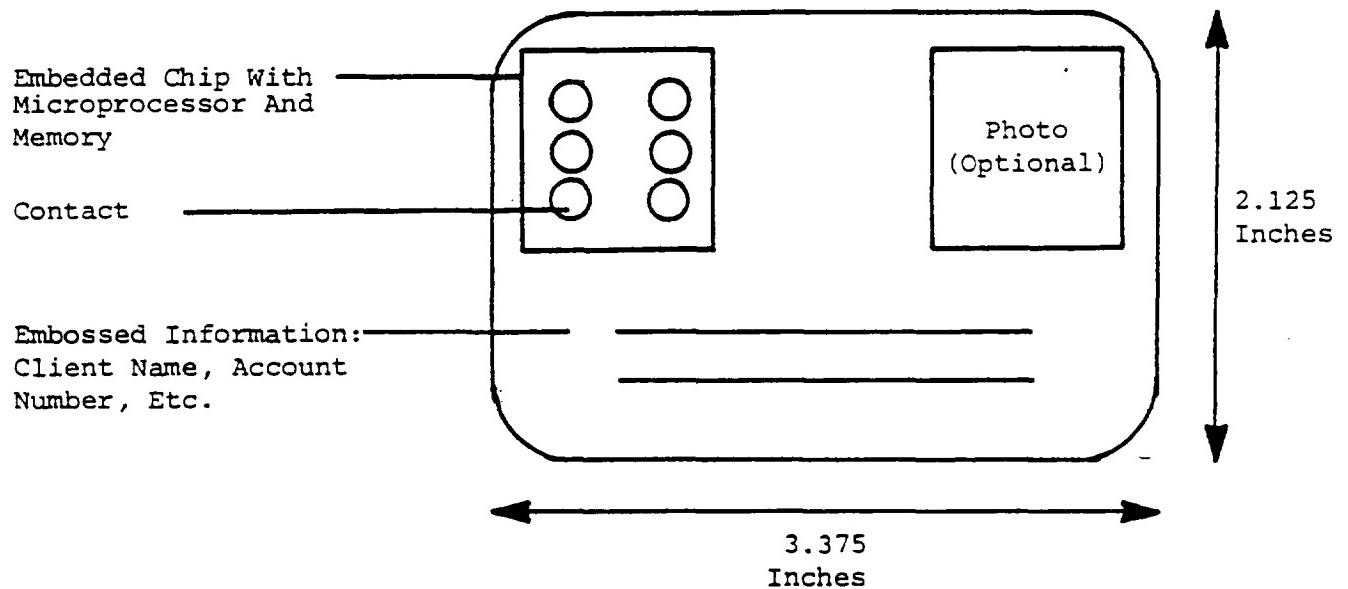
These cards, if successfully developed, could have an impact on off-line EBT as it may be more economical to issue a more powerful and expensive card to clients expected to stay on the food stamp roles for a long period instead of reissuing the cheaper card repeatedly.

In the upper left-hand corner of the client card are external contacts which would interface to the card reader at the retailer and State issuance offices. Mounted beneath these contacts are the microprocessor and memory. An illustration of a generic chip-in-card is provided in Exhibit IV-4.

Card Reading Terminal At Point of Sale—At the point of sale, each check-out lane will be equipped with a chip-in-card reading terminal to supply power to the card's microprocessor chip. These readers will not interface to existing check-out terminals, and will probably be identical at large, medium, and small retailers. The prototype cards and readers developed today have not been designed with the capability to interface to the UPC or ECR hardware that is used by most food retailers. The systems that have been developed, and which will be tested in France later this year, incorporate a terminal box, modem, keyboard, printer, and PIN pad. The technology has not yet been developed to interface the card readers to existing UPC or ECR hardware. Originally, chip-in-card developers had planned to interface with the existing retailers' ECR; however, this plan was dropped for a separate unit. It is not known what the cost would be to develop an interface. The advantage of an interface is that there is less opportunity for fraud at the check out counter by cashiers.

Balance Inquiry Unit—In addition to these units located at each check-out lane, a single card reader without printer or keyboard features will be available at each

GENERIC CHIP-IN-CARD



retailer so that clients may check their remaining balance before purchase. The balance will be communicated to the client through a light emitting diode (LED) display; hard copy receipts will not be supplied, as they are neither necessary nor cost justifiable.

This balance inquiry unit may be excluded at small retailers where the check-out reader can perform this function without disturbing normal customer flows through the check-out line. However, the privacy accorded to the client by obtaining the balance information at a unit physically separated from the check-out would be sacrificed since the store clerk would be present at the check-out terminal.

- Retailer Cartridge For Collecting Retailer Credits—A retailer cartridge will record transaction information which can be transferred either to the State, State appointed clearing institutions or possibly the store's depository institution for crediting of its account. The cartridge has reusable and removable memory with substantially larger capacity than that of the client card. The cartridge is plugged into the card reader terminal by the retailer at the beginning of the day, where it remains until close of business; stores open 24 hours a day will insert new cards at some off-peak hour. The retailer cartridge can contain a "black list" of lost and stolen cards. This list is updated daily at the end of the day by the State.
- Food Benefit Redemption Process—The client should check his or her balance at a balance inquiry unit before each purchase to verify remaining benefits and avoid problems at the check-out should insufficient funds exist to cover a purchase. Also, the client should notify the clerk that he or she is a food benefit recipient when he or she reaches the check-out counter. In this manner, food stamp items can be tallied separately, if this separation is not automatic to the retailer's system.

The amount of the purchase will be totalled using existing check-out terminals. At most retailers, this hardware will be either a UPC scanner terminal or an ECR. Many of these machines have a separate food stamp function which automatically monitors and prints tallies allocating allowable and non-allowable items under Food Stamp Program rules. For small retailers with no ECR, a separate addition of food stamp items must be made in another manner.

The total food benefit value to be redeemed will then be entered into the card reader by the clerk, using an attached keyboard. The client should verify this entry against the food benefit tally displayed at the UPC or ECR terminal or alternate method tally to avoid errors or fraud in the amount decremented from the card. The client will insert his or her card into the reader which "turns on the card" by supplying power through the card contacts, and enter his PIN into the PIN pad for positive identification. A signature or photo ID check may be used in addition to this security measure. The amount of the purchase is recorded simultaneously as a debit against the client card and as a credit in the retailer cartridge.

A paper receipt generated by the printer attached to the card reader may identify the amount of the debit, the date of the next balance initialization, remaining number of transactions that can be recorded before the 100 transaction limit is reached, remaining balance, date and location of transaction, or any other information deemed necessary. The number of items printed on the receipt will be a determining factor in how many transactions the card can be used for, as each item will utilize some of the card's limited memory.

A paper tape for the retailer's records will also be printed. The purchase of all non-acceptable food benefit items will be transacted with cash, check, or other tender.

Retailer Credit Deposits—The daily transaction data stored in the retailer's cartridge are communicated daily via a modem using public phone lines to the bank, State data base, or EFT switch by the retailer at the close of business each day or at some off-peak time if a store operates around the clock. Multiple-lane large stores may centralize the data from each cartridge into a central cartridge for data transmission. Client transactions, retailer credits, and an updated black list must be transmitted at least once a day.

Smaller stores may bank the accumulated credits on their cartridges either by physically delivering the cartridge to the bank where it is read by a special terminal maintained at the bank for this purpose, or by transmitting its contents to the bank on-line over a public telephone line communications link using a modem.

- Monthly Balance Update To Client Card—Each month, the State's central files are updated to reflect new benefit allotments. These benefits are transferred to the client cards at special card reading and updating terminals located at the State, project area or contractor offices. Unused balances from the previous month can be carried forward and adjustments in monthly allotments due to changes in client status can be controlled.
- The monthly balance update to the client card is a credit included in the 100 transaction per card limit. This limit should allow the life of the client card to extend several months. The paper receipt which accompanies each food transaction or a simple balance inquiry at the store or balance updating station may communicate to a client when a card's transaction limit is about to be reached.
- A new card will be issued and initialized at the updating station during a regular trip, when it is estimated that the number of transactions that can be recorded on the client card is insufficient to last another month. This card will be initialized with the new month's allotment plus any remaining balance of the old card. The old card will be stored or destroyed by the State.
- Compatibility with Existing Systems—As stated previously, the U.S. banking industry has invested heavily in magnetic stripe technology and on-line automation of financial transactions through the development and operation of automated teller machine (ATM) and in-store banking systems. Technical standards for access cards have been developed and adopted in the U.S. and worldwide. Extensive communication links have been established at substantial cost.
- Most of the chip-in-cards produced to date are slightly thicker than traditional bank cards, and do not conform to the thickness specifications (.03 in.) of the ANSI and ISO card standards. These cards will not fit in any existing ATM or POS terminal. It has been reported that thinner chip cards have been produced, but not yet confirmed. However, as exemplified by International Micro Industries, techniques such as tape automated bonding will make it technically feasible to produce a card conforming to bank card standards. Some manufacturers have developed prototype magnetic stripe chip-in-cards although how these cards would be applied has not yet been worked out.

As stated previously, chip-in-card equipment as currently designed is incompatible with the food retailers' equipment and thus requires duplicative types of equipment. Once the data is communicated via the modem onto a phone line, the off-line system becomes on-line and thus is compatible with existing systems.

- Reliability—Off-line system reliability requirements vary somewhat from on-line systems. The off-line capability of chip-in-cards will eliminate the reliance on extensive communication links needed for on-line authorization and account crediting and debiting. Off-line system must only rely on public phone lines once a day.

- Card Reliability—Most cards produced today use metallic contacts to perform the connection between the card and the reader. While no demonstration or pilot test has yet been conducted, it is unknown whether contact wear and corrosion will cause substantial reliability problems.

The human environment may also affect card reliability. While the card is purportedly protected from temperature extremes, radiation and magnetic fields, its ability to withstand contact with food, liquids, and other paraphernalia, and its resistance to warping when carried in the back pocket by the client must be examined. Some microprocessor chips have been known to be damaged when exposed to static electricity. Card design must prevent this.

- Terminal Reliability—Terminal reliability at the point-of-sale is very important to the retailer, state, and client in an EBT system. Should a card reader break down at a large retailer, clients can be redirected to other check-out counters with operational readers at a minimum of inconvenience. However, at small or medium-sized retailers where there may be a single check-out per store with a single card reader, machine breakdown may restrict client access to the redemption of his or her benefits at that location. This problem can be remedied if State central files, updated on a daily basis, can be accessed by telephone at the retailer in emergency situations to verify the available balance. If balance inquiry units are operational, the phone call may be unnecessary, except to inform the State that a transaction is taking place which will not go through normal channels. In either case, some alternate account of the transaction must be recorded since the purchase is not automatically deducted from the card balance.

- Paper Vouchers When Card Terminals Break Down—A paper voucher may be recorded by the clerk which indicates client name, card number, current balance, amount of transaction, remaining balance, date and location of purchase, etc. One copy will be kept at the store. Other copies will be physically distributed to the client, the retailer's bank, and the State central file.

Since the client card has not been debited, a client who has made a purchase at a store with a non-operational reader can conceivably make additional purchases beyond his monthly allotment, up to the amount of the voucher, at a store with an operational card reader. This situation opens up the potential for client fraud through redemption of food benefits in excess of those allotted in a single month. The State has the following options to deal with this problem:

- .. A copy of the voucher sent to the State computer will notify the State that benefits have been redeemed, but not decremented, from the client's card. The amount of the voucher could simply be deducted from the following month's allotment at the time of client card re-initialization, or updating.
- .. Exception files maintained at the State central computer would be established which track the existence of all voucher transactions occurring as a result of terminal breakdowns. This would prevent the redemption of the extra benefit amount that was not debited during the voucher transaction.

The importance of machine breakdown to the overall reliability of the system cannot be determined at this point. There is no historical data on which to base any breakdown estimates or the degree of inconvenience suffered as a result. The POS trials in France or other pilots that may be conducted may shed some light in this area.

- Accessibility—Access to an off-line EBT system by an authorized client would not be restricted at any food retailers because the chip-in-card terminal at the points-of-sale will not rely on existing hardware in order to operate. Any retailer can install an independent, stand-alone unit. Non-food retailers and other organizations currently authorized to accept food stamps would not be eliminated from the system either. Since the terminals are off-line, a mobile unit, such

as a milk route, could carry a card reader terminal along in the vehicle. Special units with their own power supply would have to be developed. In these rare cases, it is probably not necessary to also require balance inquiry units.

- Client Accessibility At Retailer—An off-line EBT system must meet or reduce the check-out time required for a coupon-based transaction or its conceptual design will be rejected by retailers. Under normal circumstances, this requirement would be met. However, if the recipient's card balance is insufficient to cover the food purchase and the client has failed to determine this by checking his balance, or the PIN entered by the card holder is rejected by the card reader, the time spent in clearing up the problem or negating the food tally in the UPC system or ECR terminal and card reader will more than offset any time savings that would have occurred. This potential problem is the same for on-line and off-line systems.

Since the chip-in-card power supply at each check-out counter is a separate, off-line terminal, numerous or simultaneous inquiries within the total EBT system will not have any impact on the response time at any point-of-sale.

- Redundancy—The conceptual design of an off-line chip-in-card EBT system includes the recording of transaction data at multiple points: client card memory, retailer cartridge memory, client paper receipt, and retailer printed tape. Proper retailer account crediting at the bank and maintenance of records for the Treasury and State central files is, therefore, assured in the event of loss of the retailer cartridge.

Should a client card be lost or stolen, transaction records submitted off-line daily by the banks (or the retailers) to the State will allow for the issuance of a new card with a reasonable assurance of the proper benefit balance the client is eligible to receive. This method is by no means fool proof.

Some method would have to be developed to turn off "falsely" reported lost or stolen cards at the retailer. This can only be done if every cartridge has an updated memory capability which will hold a lost/stolen card black list file. In this way, priority lost or stolen card numbers (whether the cards are fraudulently reported or not) can be transferred to the off-line units from the State once a day.

The State's central computer will have built-in redundancy in the form of back-up main memory in case the computer must shut down for maintenance.

- Security—Chip-in-card technology provides various security features to an EBT system at all levels: to the client, to the retailer, to the bank, and to the state.

For the card holder, a secure PIN contained within the card memory prevents unauthorized access to food benefits. No one finding a card will be able to ascertain the card's PIN by trial and error. After a certain number of unsuccessful attempts, further access will be blocked and all data on the card will be erased. The retailer cartridge can be designed to record "blocked" cards so reports of theft and lost cards can be confirmed by the State. In a household where a number of individuals must have knowledge of the PIN, the possibility exists that other individuals may obtain knowledge of the PIN for unauthorized use of the card.

Since the card holder's balance is carried directly in the card, the security afforded the retailer is a guarantee of same-day or next-day reimbursement after the retailer credits are transferred to the bank. The risk of non-payment through insufficient funds is non-existent, in that the transaction is aborted should the reader find that the food benefit balance on the card is insufficient.

For the bank, the costs and risks of error associated with handling food stamp coupons and coins are eliminated. The features of the actual mode for transmitting client transaction information to the State computer and retailer account credit information to the Federal Reserve, must ensure a high level of security in the communication of this information.

Chip-in-cards can not be counterfeited, reproduced, or otherwise tampered with without a significant investment by computer experts. Neither certified benefit recipients nor unauthorized individuals will be able to alter the control features of the card. No one will be able to circumvent the operational rules imposed on them, such as the maximum dollar value of transactions in a given time period and the expiration date of the card. Thus, government funds for food stamp benefits will be afforded a high level of security. Chip-in-card security is believed to be superior to that of magnetic stripe cards which can be "buffered" by experts in computer fraud.

While these security features afforded each element in an EBT system may seem substantial, it should be emphasized that chip-in-card technologies have not been tested in an ongoing operational environment and therefore, the quality of many of these features may or may not be adequate for an off-line EBT system.

3. THE ECONOMIC FEASIBILITY OF THE SYSTEMS SHOWS SUBSTANTIAL DIFFERENCES IN ESTIMATED COSTS, DEPENDING ON THE IMPLEMENTATION STRATEGY

To determine economic feasibility, the costs of the design, development and implementation of EBT at various levels of transaction volumes were estimated. A variety of alternative design and implementation scenarios are possible which have direct impact on estimated costs. Trade-offs associated with anticipated cost reductions in an operational system must also be considered. These would include reductions in loss from errors, fraud and abuse as well as reduction in some administrative costs. An in depth study of existing issuance costs as well as estimates of fraud, abuse and error is being undertaken by Birch & Davis Associates, Inc. Because data have not yet been collected for the study, numerous assumptions have had to be made regarding their costs for the purpose of determining the economic feasibility of an EBT system. These factors are further confounded by the variety of issuance systems in place throughout the U.S. and their varying administrative costs.

Essentially, each geographic area and each system scenario will have to be examined in light of these variations. The methodology used to develop the estimates of system scenarios can be easily modified to be representative of the specific configurations under final consideration.

The remainder of this section presents an overview of the methodology and assumption and costs for each of the scenarios (and conceptual systems). These are further detailed in Appendix A.

(1) The Methodology For Estimating Economic Feasibility Was Based On Use Of Geographic Scenarios

For the purposes of evaluating the financial impact of an EBT system, three project area scenarios to which expected costs of initial capitalization and operations were applied. The areas are based on the number of food stamps benefit households. They are:

- 2,000 households—Representative of many small towns and rural communities; there are 2,778 such project areas
- 10,000 households—Representative of small to medium-sized towns or counties and outlying suburbs; 136 such project areas exist
- 100,000 households—Representative of large metropolitan areas; only 8 such project areas actually exist in the United States today

A detailed pro forma cost statement was prepared for each project area scenario and each EBT system approach as follows:

- On-Line Stand-Alone Approach
- On-line Piggybacking Approach
- Off-line (intelligent card) Stand Alone Approach

No piggyback scenario was developed for off-line intelligent card as there is no indication that such a system will be developed in the near to medium range future.

In order to provide cost estimates which reflect approximations of the actual costs incurred, it was decided not to construct a nationwide financial scenario. The nature of on-line and off-line technologies is such that the number of assumptions required for a nationwide scenario would result in such a low confidence for the bottom line estimates that they would be of little use in decision-making.

The methodology employed provides the following analytical advantages:

- Reasonable confidence levels
- Comparisons of alternatives
- Estimates of economy of scale impacts
- Unit cost estimates
- Detailed conceptual system designs
- Format into which more refined cost estimates can be inserted as they become available.

(2) The Assumptions Upon Which The Costs Were Estimated Are Key

To accomplish the cost analysis a set of assumptions were developed for each EBT system alternative and each project area scenario. Programmatic considerations were incorporated into those assumptions and are documented. Extensive research was conducted involving contact with industry experts, network operators, and vendors to identify all anticipated cost areas and make reasonable cost estimates.

The assumptions made for the cost analyses constituted fairly detailed descriptions of how the particular system, on-line stand-alone, on-line piggy-backing, and off-line systems, may look in a real world application. There are three levels of detail, as follows:

- Overlying program assumptions
- System component description assumptions (Appendix A)
- Specific item cost assumptions (Appendix A)

Overlying program assumptions upon which the cost estimates were developed are presented below:

- Costs reflect implementation in a mature environment where production models of all hardware and software are available at some economies of scale. This means that there is a higher degree of confidence in the cost estimates for on-line

options as every component of those systems is in full production from at least one vendor. Estimates for off-line systems components are best-guess estimates by industry experts, as no production models are currently available.

- If a dual, paper-based system must be in place due to travel by recipients either in or out of the project area, those costs are not included.
- Certification, investigations, and other procedures not specifically related to issuance which exist now and will continue to exist with EBT are not included.
- All costs are in 1982 dollars.
- Estimates do not take into account all aspects associated with demonstration funding.
- The scenarios assumed project areas are starting from scratch; i.e., there are no existing systems which can be used for EBT such as automated data base or plastic card base.

(3) Cost Estimates Are Provided By System Type And By Scenario

Summary cost statements for each system under the three project area scenarios are presented below along with a discussion of feasibility implications. Detailed pro forma statements and accompanying assumptions can be found in Appendix A.

- On-Line Point of Sale System—Exhibit IV-5 lists the costs of an on-line system by major category. The important bottom-line figures per household for each scenario are consolidated below:

ON-LINE SYSTEM COSTS IN DOLLARS PER HOUSEHOLD

		2,000 Households	10,000 Households	100,000 Households
Piggybacking	Initial Capitalization	98.55	42.05	14.95
	Operating Costs	58.61	32.61	21.31
Government Stand Alone	Initial Capitalization	159.16	111.66	61.91
	Operating Costs	70.39	41.05	24.45

## HYBRID ON-LINE POS SYSTEM COSTS BY CATEGORY

(COSTS IN THOUSANDS OF 1981 DOLLARS)

COSTS	PIGGYBACKING			GOVERNMENT STAND ALONE		
	2,000*	10,000	100,000	2,000	10,000	100,000
<u>Initial Capitalization</u>						
Cards	1.30	6.50	65.00	1.30	6.50	65.00
Terminals	10.80	54.00	540.00	97.00	485.10	4,851.00
Communications	-	-	-	5.00	10.00	50.00
Computer Hardware And Software	85.00	200.00	580.00	105.00	385.00	775.00
System Design	20.00	30.00	60.00	30.00	100.00	200.00
Training, Regulations, And Procedures	<u>80.00</u>	<u>130.00</u>	<u>250.00</u>	<u>80.00</u>	<u>130.00</u>	<u>250.00</u>
Total Initial Capitalization	197.10	420.50	1,495.00	318.30	1,116.60	6,191.00
Per Household (Not 000's)	98.55	42.05	14.95	159.16	111.60	61.91
<u>Operating Costs</u>						
Cards (New And Replaced)	0.82	4.11	41.17	0.82	4.11	41.10
Terminals Replacement	-	-	-	4.30	21.55	215.55
Maintenance	-	-	-	5.10	25.49	254.88
Communications	-	-	-	17.46	87.30	873.00
Operations (Including Staffing)	80.00	140.00	270.00	90.00	210.00	440.00
Transaction Fees	<u>36.40</u>	<u>182.02</u>	<u>1,820.20</u>	<u>23.09</u>	<u>.62.03</u>	<u>620.25</u>
Total Operating Costs	117.22	326.14	2,131.30	140.78	410.49	2,444.86
Per Household (Not 000's)	58.61	32.61	21.31	70.39	41.05	24.45

\* These numbers refer to number of households in a project area

As would be expected, the cost per household declines in all cases as fixed costs are spread over a greater number of households. This relationship is evidenced to a greater extent for initial capitalization cost where most costs of start-up are fixed.

This concept of economy of scale traditional to most businesses has had an especially strong effect on the development of electronic funds transfer systems in general. The high costs of developing such systems requires significant transaction volume to justify. In the food stamp case, the volume which constitutes a "critical mass" is dependent on the specific level of costs which are being replaced.

While the cost per household figures illustrate more efficient use of fixed cost items, absolute dollar costs of establishing on-line systems should also be considered in a decision to enter into the investment. A stand-alone system in a major metropolitan area is estimated to cost in excess of \$6.1 million dollars to establish. This would represent about five percent of the total benefits (\$120,000,000) which would be expected in that size city in a year.

By contrast the \$318,000 investment required to establish a stand-alone system in an area with 2,000 households would constitute about 13 percent of the \$2.4 million dollars of benefits which would be disbursed there. The seemingly high costs of developing on-line POS in smaller areas does not necessarily mean that an EBT system is too expensive for that size area, as the fixed cost investment for small project areas can be shared with other contiguous areas, either a group of small areas or a larger city.

- Off-Line System—Exhibit IV-6 lists the cost of an off-line system by major category. The important bottom line figures for each project area scenario are listed below:

OFF-LINE SYSTEM COSTS IN DOLLARS PER HOUSEHOLD

	2,000 Households	10,000 Households	100,000 Households
Initial Capitalization	182.00	150.24	97.29
Operating Cost	77.14	42.45	25.55

As in the on-line case, fixed costs, when spread over a greater volume (number of participating households), make larger metropolitan areas more attractive on a per unit basis.

## EXHIBIT IV-6

## OFF-LINE EBT SYSTEM COSTS BY CATEGORY

(COSTS IN THOUSANDS OF 1981 DOLLARS)

COSTS	2,000*	10,000	100,000
<u>Initial Capitalization</u>			
Cards	10.00	50.00	500.00
Terminals	153.00	797.40	7,974.00
Communications	1.00	5.00	10.00
Computer Hardware And Software	90.00	395.00	670.00
System Design	30.00	100.00	200.00
Training, Regulations And Procedures	<u>80.00</u>	<u>155.00</u>	<u>270.00</u>
Total Initial Capitalization	364.00	1,502.40	9,729.00
Per Household (Not 000's)	182.00	150.24	97.29
<u>Operating Costs</u>			
Cards (New And Replaced)	8.47	42.35	423.45
Terminals	6.75	33.75	337.50
Maintenance	12.85	64.26	642.60
Communications	1.00	5.00	20.00
Operations (Including Staffing)	90.00	210.00	440.00
Transaction Fees	<u>35.21</u>	<u>69.18</u>	<u>691.77</u>
Total Operating Cost	154.28	424.53	2,555.32
Per Household	77.14	42.45	25.55

\* These numbers refer to number of households in a project area

However, the absence of any near or mid-term likelihood that any other party will be involved with off-line systems in U.S. retail stores means that initial capitalization costs cannot be avoided. This initial outlay would be over \$9 million dollars for a large metropolitan area and over \$360,000 for a 2,000 household project area. These figures are magnified when viewed in light of the fact that the cost estimates employed are based solely on industry experts' opinions of possible future economic quantity production levels. While pilot tests of off-line intelligent card systems are beginning now in France, some of the equipment required for a food stamp EBT have not even been built in prototype.

Despite the high price of the card in the off-line system, it appears that if all was to go according to plan, at some point the system would approach the per household annual operating cost level of on-line systems in large scale areas. Caution must be used in this area: in light of the sizable adaptations necessary for using off-line for EBT back-up systems for down terminals, State recapture, and posting of daily transactions, etc., the cost of developing and operating off-line in any large scale implementation will most likely be higher. As no suitable solutions to some of the problems specific to EBT off-line have as yet been developed or proven, it is not possible to reflect those costs in our figures. The costs, therefore, reflect a system which is not as complete as the on-line alternatives.

4. THE PROGRAMMATIC FEASIBILITY OF EBT SYSTEMS, WHICH IS AS CRITICAL AS TECHNOLOGICAL AND FINANCIAL FEASIBILITY, WAS ALSO EXAMINED

Criteria for assessing programmatic feasibility include:

- Continued participation of a number of retailers so that client access is not limited
- Equality of treatment of the client in the food store
- Availability of balance information without necessity to purchase food
- Provision for expedited service so that households with immediate need can receive benefits
- Ability to transfer household benefits to an authorized representative
- Change of IDs and access cards when cards or IDs are lost or stolen

- Protection of client confidentiality
- Acceptability of new system by the client.

Most of these criteria have been previously addressed within the technical feasibility section. Likewise, Chapter III discusses the potential impact of an EBT system on the food stamp client and concludes that the system has more potential advantages for the bona fide client than disadvantages. For clients intending to defraud the system, there would be many more constraints, requiring high levels of electronic funds transfer knowledge in order to defraud the system.

There are two issues, however, of particular importance relative to clients which require further discussion. These are acceptability and workability.

(1) Acceptability Of EBT To Food Stamp Clients Is Of Course Of Ultimate Importance

Client acceptance of the EBT card will be an important factor in the feasibility of an EBT system. Clients will have certain responsibilities associated with the use of electronic access card which do not currently exist in the food stamp program. These responsibilities include:

- Willingness To Learn How To Use The Card—Clients will have to learn how to obtain the initial cards, how to use the personal identification number, how to obtain access to their benefit account balance, and how to use that card in a variety of food retailer environments. Although clients may approach the new system with some hesitancy, once the reliability and convenience of the system has been demonstrated, clients should gain confidence in their ability to readily access the system through use of their card.
- Protection of the PIN—Clients will have to accept responsibility for the protection of the PIN from unauthorized users. This may require that the PIN only be given to responsible adults within the household. Access to the PIN by children will have to be limited so that the PIN may remain a secret number for that household. If a photo ID and signature card are used with the electronic card, the food purchases may further be limited to only authorized users. Clients who have difficulty keying in a PIN at the retail outlet, such as those with poor eyesight and with physical disabilities, may have to ask for assistance from an authorized representative. The biggest client responsibility, however, will be to remember the PIN without writing it on the card.
- Protection of the Card—The client will have to ensure that the card itself is protected from abrasion, static, and other elements that could affect the card's capacity to be accepted by the electronic terminal. The card will have to be kept safe from small children and pets who could damage the card.

- Immediate Reporting of Lost or Stolen Cards—The responsibility of clients to report theft or loss immediately to the project area is similar in an EBT system to that in the current system. This will be particularly important if benefits are to remain uninterrupted. Frequent losses and thefts of the cards will require alternative issuance procedures and follow-up by State investigative units as under the existing system.

The responsibilities of the client are primarily associated with the card and PIN. These are new responsibilities which clients must be willing to accept, otherwise the programmatic feasibility of the system could not be demonstrated.

(2) System Exceptions, If Great Enough In Volume, May Make System Unworkable

Although the majority of clients will be capable of accepting responsibility for the card and its use, there will be some clients who will either not be capable of caring for and using the card properly or who will participate in fraudulent practices. The number of recipients who would fall into this category is not known. For those unable to use the card appropriately, an authorized representative can be designated.

Fraud and abuse may be more difficult to prevent. For instance, without a photo and signature card there would be nothing to prevent a client from selling the card (with its monthly benefits) and the PIN to another individual, as food stamps are currently sold. If the card was subsequently reported as stolen or lost, duplicate benefits would not be issued in the case of on-line cards as these cards can be "turned off" at the central data center. With off-line cards, such as the chip-in-card, the stolen card would be identified in the black list, so access to benefit value would be secure. The value of any loss, however, would be limited to a single card for a single month.

Acceptability and workability of an EBT system can be enhanced by thorough client training on the part of the State or project area. States which have been developing and implementing alternative issuance strategies, such as New York and Michigan, have developed thorough training programs for the clients. These programs serve to give knowledge and encouragement to use the system and to caution recipients not to abuse and defraud the system.

In conclusion, systems are designed to handle the exceptions. This should be true for programmatic considerations as well as for the technical and economic considerations, as it will ultimately be the responsibility of the client to make the EBT system workable.

CHAPTER FIVE

DEMONSTRATION OF ELECTRONIC BENEFIT TRANSFER  
SYSTEM ALTERNATIVES

## V. DEMONSTRATION OF ELECTRONIC BENEFIT TRANSFER SYSTEM ALTERNATIVES

The conclusion reached during the course of this study is that the on-line EBT system as conceptualized is technologically and financially feasible as an alternative for the issuance of food stamp benefits to eligible clients and households. The off-line system appears to be conceptually feasible but is not yet in a State that it can be demonstrated cost effectively. The purpose of a demonstration of an on-line system would be to test the applicability and the adaptability of the technologies to the Food Stamp Program on a large, operational scale. Equally as important, the demonstration would test the acceptability of the alternative system to the retail grocers and clients, bankers, and other organizations who participate in one way or another in the food stamp issuance, redemption, and reconciliation processes.

The purpose of this chapter is to present considerations and recommendations for initiating demonstration activities. The underlying assumption herein is that the Food and Nutrition Service will indeed proceed to sponsor one or more demonstrations in which the system alternatives can be tested in the operational food stamp environment. The recommendations which follow are grouped into several categories:

- Design of the Demonstrations
- Implementation and Monitoring of Demonstration Activities
- Evaluation of Demonstrations
- Competition for Demonstration Contracts
- FNS Coordination with EBT-Related Industries and Interest Groups.

### 1. DESIGN OF EBT DEMONSTRATIONS

**RECOMMENDATION:** The Food and Nutrition Service should sponsor one or more demonstrations of an on-line piggybacked system based upon the results of a competitive bid process.

The minimum characteristics of the demonstration(s) should be as follows:

- The on-line system should be demonstrated in a relatively large, urban project area
- Essentially all grocery retailers and clients in the area should participate in the electronic benefit transfer system
- The geographic area(s) selected should meet specific criteria regarding available networks and financial systems which are already in place and upon which the demonstration can piggy-back

- The demonstration(s) should last long enough to allow for the arrangements to be made and the hardware and software to be put in place and operationalized, for full routine system operation so that all "bugs" can be identified and/or worked out and the system truly function in a routine fashion, and for evaluation of costs, input and effectiveness of the system.
- Although FNS has determined that the demonstration contracts will be made to vendors of systems rather than to States, the closest coordination and cooperation between the two will be essential to assure continued integrity of the benefit delivery and redemption processes.

As noted previously in Chapter IV, it is likely that the on-line system alternative can be implemented in the near-term future as every element of the technology required for food stamp issuance exists today and has been demonstrated in private sector payment system applications. It is possible that the transaction volume provided by the Food Stamp Program in a demonstration will actually speed the development of on-line POS systems, contributing to the "critical mass" transaction volume required to justify investments in these systems by the private sector.

The fact that vendors, banks, and retailers have already expended great effort and money in the development of on-line systems also makes such systems more feasible. A relatively large-scale demonstration is needed to test the application of the system to the Food Stamp program environment and requirements.

RECOMMENDATION: The Food and Nutrition Service should solicit proposals from U.S. and non-U.S. vendors for off-line EBT systems, including other advanced technologies in addition to smart card technology.

This would permit USDA to continue to monitor smart card developments and tests in France prior to committing any USDA funds for a pilot demonstration in the United States. The USDA solicitation should include specifications of off-line requirements appropriate to Federal and State benefit programs and retailers.

The smart card technology has many very attractive features and for this reason should not be discounted. However, prior to the application of such an advanced technology in a demonstration, the technology itself should be tested and debugged in a live retail environment. Some critical aspects of the state-of-the-art relative to chip-in-card technology which must be resolved prior to undertaking a demonstration are:

- The vendor(s) must demonstrate understanding of food retailer requirements regarding system design and performance and must indicate willingness and ability to meet these requirements.
- The smart card tests in France in mid-1982 should be carefully monitored to determine actual retailer response and acceptability of the technology; problems in the test should be carefully noted as part of the assessment of the workability of the system.

- The equipment required to support the off-line system in the retail environment needs to actually exist, meet retailer requirements (as above), and be able to be produced at an acceptable cost per unit (considerably less than the costs of current equipment).

The value of requesting proposals on concept papers for other off-line technologies than chip-in-card is that developments which are closer to being able to be demonstrated might be identified. The off-line concept has much merit and should be pursued even if the chip-in-card technology is not yet mature enough for testing.

RECOMMENDATION: The EBT system(s) selected for demonstration by FNS should be compatible with the electronic banking services in existence and/or planned for the locality and State.

A continuation of recent trends of growth in EFT point-of-sale technologies, and especially with the replacement of check transactions by bank debit cards, is expected over the next 18 months. Electronic banking is decreasing the cost of check processing and the costs per transaction are expected to further diminish as ATMs and debit card volumes increase. If food stamp transactions were added to this growing volume, even greater financial incentives would appear for the penetration of on-line POS into the retail environment. (See Exhibit V-1 which reflects the current volume of EFT interchange in the U.S. and plans for growth within the next several months.)

Several specific advantages will accrue to FNS by designing the EBT system to closely coordinate with existing and planned electronic banking systems:

- Retailers would find the EBT more acceptable if the POS equipment could be used for several applications, notably holders of bank debit cards
- Cost per transaction could be substantially decreased if transaction volume on the EBT system and the communication switches used by the EBT system was increased by being used for other applications
- The lower cost per transaction would serve as a further incentive for private sector systems to increase their penetration of the POS market, therefore resulting in lower costs for FNS (and others) especially in the capitalization of POS equipment
- The already-established protocols for payment in electronic funds transfer have been worked out carefully and at some considerable effort and cost over the years; should FNS choose to accommodate to those protocols, significant avoidance of error and "down time" can be expected

RECOMMENDATION: In order for an EBT to succeed, FNS must attend to the system design requirements of the EBT system including reporting and auditing requirements of each participant in the issuance and redemption process.

## EXHIBIT V-1

STATUS OF UNITED STATES EFT INTERCHANGES<sup>1</sup>  
(AS OF OCTOBER 1, 1982)

Total Number of Magnetic Stripe Credit And/Or Debit Cards In Use In The United States:<sup>2</sup> 250-350,000,000

Total Number Of Magnetic Stripe Cards In Use By Customers Of Banks Participating In Shared ATM Systems:<sup>3</sup>

Current Card Members	19,225,000
Signed(But Not Yet Operational)Members	2,900,000
	<u>22,125,000</u>

Total Number Of Banking Institutions Participating In Shared ATM Systems:

Current Institutional Members	2,100
Signed(But Not Yet Operational) Members	500
	<u>2,600</u>

Geographic Coverage Of Shared ATM Systems

	<u>Current</u>	<u>Planned</u>	<u>Total</u>
Intrastate	25	10	35
Interstate/Regional	12	2	14
Nationwide	0	5	5
	<u>37</u>	<u>17</u>	<u>54</u>

Shared ATM Systems Using Switch Interchanges

	<u>Current</u>	<u>Planned</u>	<u>Total</u>
Own A Switch	16	10	26
Access Switch	9	4	13
	<u>39</u>		

Average Monthly Switch Volume(Total) 10,400,000 Transactions

Number Of Major United States EFT Switch Suppliers/Vendors 13

1 Based on original research by The Orkand Corporation which appears in EFT Interchange: A Directory Of Shared ATM Services, recently published by the American Bankers Association

2 John Hynes, Ph.D., Malco Plastics

3 Many of these cards also operate in merchant POS systems

Throughout the discussions of advanced technologies for EBT, various aspects of the system have been referenced. The linking of participants, the flow of information and funds, card types, data processing steps, and security—to mention a few—are components of an integrated whole. Integration of the components into a rational system and attention to assure that all the pieces "fit" together will be required for EBT to work. According to Gerard Milano, Director of the American Bankers Association, "...an EFT operation will fall flat on its face if it only looks at technology but ignores the accounting and information requirements, how they will be integrated into the system and how people actually get paid." FNS should expect that this responsibility will fall on them and assure that they have the proper resources and information at hand to design a system that will work.

RECOMMENDATION: The demonstration design should consider incentives for the participation of retailers, including some minimal per transaction fee for reimbursement of handling and processing costs.

RECOMMENDATION: The demonstration design should include specific attention to the issue of acceptability of the EBT technology to a variety of publics, including but not limited to the clients who use the new card-based technology, the general public who will observe the use of the technology in the store but who may not participate in it, and the retailer's employees who must interact with and implement or operate the technology.

The programmatic areas of assessment indicated in Chapter IV included acceptability and workability criteria against which system alternatives were considered. The familiarity of the general public with credit cards and their use, plus the increased use of ATMs and EFT technologies for numerous applications, makes the on-line system more familiar to many clients than would be the off-line. Experience over the past 15 years of POS development indicates that resistance to the technology usually decreases dramatically as familiarity increases, with one of the major determining factors being the reliability of the equipment and service it provides. It can be expected that similar experience would occur for the food stamp client population during the demonstration, but at any rate it should be one focus of evaluation activities within the demonstration.

## 2. IMPLEMENTATION AND MONITORING OF DEMONSTRATION ACTIVITIES

RECOMMENDATION: The Department of Agriculture should develop a master plan to guide its EBT-related activity, including its criteria for success for such a system and its priorities for the desired impact of the system.

This plan would be used to guide the specific efforts of FNS in the EBT area for 18 to 36 months, would provide important insight to vendors who might respond to an EBT demonstration solicitation, would provide guidance to States and Regional Offices in setting up and monitoring demonstration activities, and would pre-establish the focus of the evaluation activities which should take place routinely as part of the demonstration.

RECOMMENDATION:

FNS should prepare and distribute to all States a briefing document which would provide a means to educate themselves about EBT and FNS priorities therein.

The document should include an overview of EBT systems and technological alternatives, the potential implications of adoption of such a system for Food Stamp operations, a summary of the FNS plan of activities relative to EBT, a general statement of the role States would be likely to play in any EBT demonstration, and the areas where the States would expect to interact with vendors during demonstration development and operation. The overall purpose of the document would be to prepare the States to deal with vendors and groups seeking to set up the necessary relationships to operate a demonstration.

RECOMMENDATION:

FNS should be prepared to provide technical assistance to any State so requesting it in working with a vendor who seeks to submit a proposal for an EBT demonstration.

The focus of the technical assistance would be two-fold:

- To provide assistance in developing the requirements for a system design which would assure both the uninterrupted delivery of food stamp benefits to clients and the continued control of program operations by the State (not the vendor) during the demonstration period.
- To provide assistance in examining the technologies proposed by the vendors in order to assemble the best combination of system characteristics to meet State program needs.

RECOMMENDATION:

FNS should establish and have available implementation plans for monitoring and controlling the demonstrations.

As part of establishing evaluation criteria for overall demonstration success, benchmarks for interim decision-making should be established and included in the EBT planning document. These should include criteria relative to cost, target dates, hardware and software performance characteristics, error and/or fraud rates, client and retailer acceptance, etc. At specified interim marker points, failure to meet one or more of these criteria may be grounds for discontinuation of the demonstration, for determining that its chances of success are insufficient to warrant continued effort.

A second part of the monitoring plans should be a reporting procedure plan which will allow FNS Washington to monitor system performance regularly (quarterly) without the requirements for frequent travel on-site to review progress.

### 3. EVALUATION OF DEMONSTRATIONS

RECOMMENDATION:

Evaluation requirements should be built into the initial design of the demonstration and carried through as a high priority.

Design of the evaluation activities should be accomplished at least in general before the actual demonstration begins. Of greatest importance—and at least partially to be accomplished in putting together the plan for FNS activities relative to EBT—is the specification of objectives of the demonstration and of the evaluation of the demonstration activity. The evaluation design can specify the periodicity of data collection, the necessity and characteristics of any control or comparison groups, etc. These requirements should be known to the vendor and proposed participants in the demonstration project before demonstration activities begin.

RECOMMENDATION: Baseline data collection should occur as soon as possible after the demonstration site selection to obtain it without reflection of any change that occurs.

RECOMMENDATION: The demonstration should last long enough that a "steady state" can be achieved so that the evaluation reflects operating characteristics of the system and not the implementation state

At least one year of operation after approximately a three month start-up period is the minimum for collecting adequate data. If there are seasonal variations in the area, it is better to have a longer operational period to assure that the data are untainted by start-up or close-down mentality at either end of the period.

RECOMMENDATION: Although the routine data collection can be done by the vendor or by the staff of the State program office in most cases, the actual evaluation itself should be performed by an objective third party.

This is less because of concern about bias that might be introduced by "self-evaluation" and more because of the fact that the pressure of operating a system or monitoring it in practice tends to pre-empt the time set aside for evaluation activity, which almost always is considered a lower priority than maintenance of day-to-day operations.

#### 4. COMPETITION FOR SELECTION OF DEMONSTRATION CONTRACTORS

RECOMMENDATION: The solicitation for vendors for EBT demonstrations should be thorough, providing not only detailed system specifications but also requirements for working arrangements between vendors, States, regional offices, FNS, and other key parties.

The statement of FNS objectives and priorities in regard to the demonstration will be critical to guiding the demonstration.

A series of steps in the procurement process may be most beneficial to all concerned in order that FNS be alerted to the concerns and problems raised by the request for bids and that vendors have the opportunity to be fully informed about FNS goals, intent, and requirements suggested steps include:

- Announcement of a Request for Information
- Pre-Release RFP to which vendors can respond with questions and suggestions to permit modification of the RFP prior to its release for competitive bidding and also to serve to give notice to potential bidders as to the requirements of the system so they can begin assembling the teams and participants required
- A bidders conference to allow formal questions about the intent of the revised RFP
- Provision of technical assistance to the States, if requested, in the development of useful and feasible system designs

RECOMMENDATION: The Request for Proposal should include the requirement that the vendor document clearly that the support and cooperation of the key participants in each demonstration area has been obtained as a condition of participation in the demonstration.

Letters of cooperation which specify the nature of the relationships and commitments established between the vendor and the major participants should be required in addition to description of the arrangements being included in the body of the proposal.

RECOMMENDATION: FNS should establish a review panel for the vendor proposals which includes individuals from outside the Department of Agriculture who have specific technical skills and relevant experience which can be brought to bear on review and evaluation of the system proposals.

The use of additional personnel from within the Federal Government who have directly relevant experience may provide many advantages to FNS. The experience of contracting for such a potentially large system is not a common one for FNS, so there are possible benefits to FNS procedurally as well as technically. A beneficial side effect also is the resulting increased inter-agency communication.

#### 5. FNS COORDINATION WITH EBT-RELATED INDUSTRIES AND INTEREST GROUPS

RECOMMENDATION: FNS should continue to monitor industry developments on all types of technology which have potential applicability to an EBT system for the Food Stamp program.

RECOMMENDATION: FNS should immediately establish a Task Force of representatives from all of the major food retailer organizations to participate directly with the Department in specifying the EBT system(s).

Experience with POS systems designed by financial institutions or others for retailers has shown delays of acceptance before success is achieved. This has happened in several countries in addition to the United States, and may be said to be occurring now in France where few retailers appear to be planning to participate in the smart card tests. This lesson is that food retailers must actively participate in designing a system to meet their needs, if it is to gain ready acceptance.

RECOMMENDATION: FNS should obtain membership in or otherwise become involved with selected organizations which determine policies concerning on-line system development, and should participate similarly in organizations relative to off-line systems, where they exist.

Organizations within which FNS should be active include the following:

- American National Standards Institute
- Electronic Funds Transfer Association
- American Banker's Association - Payment Systems Policy Board
- Various State task forces (such as in Ohio)
- Bank Administration Institute - Operations and Technology
- National Automated Clearinghouse Association

APPENDIX A  
COST ASSUMPTIONS

## APPENDIX A(1)

## PRO FORMA COST ESTIMATES FOR EBT SYSTEM ALTERNATIVES

	"PIGGYBACKING" ON-LINE POS NETWORK			ON-LINE STAND ALONE NETWORK			"SMART CARD" NETWORK		
<b>CARDS COST SUBSECTION</b>									
INITIAL NUMBER OF HOUSEHOLDS	2000	10000	100000	2000	10000	100000	2000	10000	100000
INITIAL CARDS ISSUED	2000	10000	100000	2000	10000	100000	2000	10000	100000
TURNOVER-PERCENT OF BASE PER YEAR	.97	.97	.97	.97	.97	.97	.97	.97	.97
PERCENT OF TURNOVER REQUIRING CARDS	.5	.5	.5	.5	.5	.5	.7	.7	.7
ADDITIONAL CARDS ISSUED PER YEAR	970	4850	48500	970	4850	48500	1350	6790	67900
COST PER CARD (DOLLARS)	.65	.65	.65	.65	.65	.65	5	5	5
CARDS COST-INITIAL CAPITALIZATION	1300	6500	65000	1300	6500	65000	10000	50000	500000
CARDS COST-PER YEAR	630.5	3152.5	31525	630.5	3152.5	31525	6790	33950	339500
<b>TERMINAL COSTS</b>									
TOTAL NUMBER OF RETAIL STORES	36	180	1800	36	180	1800	36	180	1800
PERCENT LARGE (COMPATIBLE SCANNER SYSTEM)	.18	.18	.18	.18	.18	.18	.18	.18	.18
PERCENT MEDIUM (COMPATIBLE SCANNER SYSTEM)	.4	.4	.4	.4	.4	.4	.4	.4	.4
PERCENT SMALL (ECR-NONCOMPATIBLE)	.42	.42	.42	.42	.42	.42	.42	.42	.42
AVERAGE NUMBER OF CHECKOUTS:									
LARGE STORES	12	12	12	12	12	12	12	12	12
MEDIUM STORES	5	5	5	5	5	5	5	5	5
SMALL STORES	1	1	1	1	1	1	1	1	1
PERCENT OF CHECKOUTS EQUIPPED:									
LARGE STORES	.5	.5	.5	.5	.5	.5	.5	.5	.5
MEDIUM STORES	.5	.5	.5	.5	.5	.5	.5	.5	.5
SMALL STORES	1	1	1	1	1	1	1	1	1
COST PER TERMINAL:									
LARGE STORES	0	0	0	1000	1000	1000	1500	1500	1500
MEDIUM STORES	0	0	0	1000	1000	1000	1500	1500	1500
SMALL STORES	0	0	0	750	750	750	1500	1500	1500
BALANCE INQUIRY TERMINALS	300	300	300	300	300	300	500	500	500
TOTAL TERMINAL COSTS:									
LARGE STORES	0	0	0	38800	194400	1944000	58320	324000	3240000
MEDIUM STORES	0	0	0	36000	180000	1800000	54000	270000	2700000
SMALL STORES	0	0	0	11340	56700	567000	22680	113400	1134000
BALANCE INQUIRY TERMINALS	10800	54000	540000	10800	54000	540000	18000	90000	900000
TOTAL TERMINAL COSTS FOR SCENARIO	10800	54000	540000	97020	485100	4851000	153000	797400	7974000
<b>TRANSACTION VOLUME SUBSECTION</b>									
AVERAGE PARTICIPATING HOUSEHOLDS	2000	10000	100000	2000	10000	100000	2000	10000	100000
AVERAGE NUMBER OF FOOD STAMP TRANSACTIONS/MONTH/HOUSEHOLD	5	5	5	5	5	5	5	5	5
TOTAL TRANSACTIONS PER YEAR	120000	600000	6000000	120000	600000	6000000	120000	600000	6000000

	"PIGGYBACKING" ON-LINE POS NETWORK			ON-LINE STAND ALONE NETWORK			"SMART CARD" NETWORK		
<b>TOTAL COSTS</b>									
<b>INITIAL CAPITALIZATION:</b>									
CARDS	1300	6500	65000	1300	6500	65000	10000	50000	500000
TERMINALS	10800	54000	540000	97020	485100	4851000	153000	797400	7974000
<b>COMMUNICATIONS:</b>									
*LINE INSTALLATION	0	0	0	5000	10000	50000	1000	5000	10000
<b>DATA PROCESSING:</b>									
*SOFTWARE	20000	30000	50000	30000	50000	100000	25000	60000	100000
*HARDWARE	50000	150000	500000	50000	300000	600000	50000	300000	600000
*INSTALLATION	5000	10000	10000	5000	10000	25000	5000	10000	25000
*INTERFACE REQUIREMENTS	10000	10000	20000	20000	25000	50000	10000	25000	50000
SYSTEMS DESIGN	20000	30000	60000	30000	100000	200000	30000	100000	200000
TRAINING AND PROMOTION	30000	50000	130000	30000	50000	130000	30000	75000	150000
<b>REGULATIONS AND PROCEDURES</b>									
50000	80000	120000	50000	80000	120000	50000	80000	120000	
<b>TOTAL INITIAL CAPITALIZATION</b>	<b>197100</b>	<b>420500</b>	<b>1495000</b>	<b>318320</b>	<b>1116600</b>	<b>6191000</b>	<b>364000</b>	<b>1502400</b>	<b>9729000</b>
<b>INITIAL CAPITALIZATION PER HOUSEHOLD</b>	<b>98.55</b>	<b>42.05</b>	<b>14.95</b>	<b>159.16</b>	<b>111.66</b>	<b>61.91</b>	<b>182</b>	<b>150.24</b>	<b>97.29</b>
<b>OPERATING COSTS PER YEAR</b>									
<b>STAFFING:</b>									
*MANAGEMENT	20000	40000	40000	20000	60000	80000	20000	60000	60000
*RETAILER, RECIPIENT RELATIONS	30000	40000	100000	30000	60000	160000	30000	80000	180000
*TRAINING AND PROMOTION	20000	40000	100000	20000	40000	100000	20000	40000	100000
*DP OPERATIONS	5000	20000	30000	20000	50000	100000	20000	30000	80000
<b>COMMUNICATIONS:</b>									
*LINE LEASING	0	0	0	17460	87300	873000	1000	5000	20000
<b>PER TRANSACTION FEES:</b>									
*TERMINAL	.05	.05	.05	0	0	0	0	0	0
*SWITCH	.15	.15	.15	0	0	0	0	0	0
*DP FILE PROCESSING	.09	.09	.09	.09	.09	.09	.09	.09	.09
*FILE ENTRY (PER NEW ENTRY)	.3	.3	.3	.3	.3	.3	.3	.3	.3
*SETTLEMENT (PER RETAILER PER DAY)	.1	.1	.1	.1	.1	.1	.2	.2	.2
<b>TOTAL TRANSACTION FEES</b>	<b>36405</b>	<b>182025</b>	<b>1820250</b>	<b>23091</b>	<b>620250</b>	<b>620250</b>	<b>35207.4</b>	<b>69177</b>	<b>691770</b>
CARD ISSUANCE	630.5	3152.5	31525	630.5	3152.5	31525	6790	33950	339500
<b>LOST CARD REPLACEMENT:</b>									
PERCENT LOST PER YEAR	.1	.1	.1	.1	.1	.1	.1	.1	.1
REPLACEMENT COST PER CARD	.65	.65	.65	.65	.65	.65	.5	.5	.5
<b>TOTAL REPLACEMENT COSTS</b>	<b>193.05</b>	<b>965.25</b>	<b>9652.5</b>	<b>193.05</b>	<b>965.25</b>	<b>9652.5</b>	<b>1679</b>	<b>8395</b>	<b>83950</b>
<b>TERMINAL REPLACEMENT:</b>									
PERCENT REPLACED PER YEAR	.05	.05	.05	.05	.05	.05	.05	.05	.05
<b>TOTAL REPLACEMENT COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4311</b>	<b>21555</b>	<b>215550</b>	<b>6750</b>	<b>33750</b>	<b>337500</b>
<b>YEARLY MAINTENANCE COSTS:</b>									
PER TERMINAL-LARGE STORE	0	0	0	60	60	60	200	200	200
PER TERMINAL-MEDIUM STORE	0	0	0	60	60	60	120	120	120
PER TERMINAL-SMALL STORE	0	0	0	40	40	40	50	50	50
<b>TOTAL MAINTENANCE COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5097.6</b>	<b>25488</b>	<b>254880</b>	<b>12852</b>	<b>64260</b>	<b>642600</b>
<b>TOTAL OPERATING COSTS</b>	<b>117228.55</b>	<b>326142.75</b>	<b>2131427.5</b>	<b>140783.15</b>	<b>410485.75</b>	<b>2444857.5</b>	<b>154278.4</b>	<b>424532</b>	<b>2555320</b>
	<b>58.614275</b>	<b>12.614275</b>	<b>21.314275</b>	<b>70.191575</b>	<b>41.048575</b>	<b>24.448575</b>	<b>77.1392</b>	<b>42.4532</b>	<b>25.5532</b>

APPENDIX B

INDUSTRY REPRESENTATIVES CONTACTED  
DURING FEASIBILITY STUDY

INDUSTRY REPRESENTATIVES CONTACTED  
DURING FEASIBILITY STUDY

American Bankers Association

Helen Brodie, Associate Director Bank Card Division

Andrew Ernst, Director Bank Card Standards

Gerard Milano, Director Payment Systems Policy Board

American National Standards Institute

Thomas Rayfield, Bank Card Committee Member-Polaroid, Boston

Tom Thomas, Secretary of Credit and ID Cards-Committee X3B10, and Research Associate, Funds Transfer Department of the U.S. League of Savings Association

Applied Communication, Inc.

William McKiever, Marketing Representative

Automated Data Processing

John Elliott, Vice President

Banc One (Ohio)

John Fisher, Senior Vice President

Bank Administration Institute

David Van Taylor, Executive Vice President for Banking Services

William Trotter, Director, Operations and Technology Group

Marjolin VanderVelde, Systems Specialist, Operations and Technology

Banque de Paris et des Pay-Bas

Phillippe Bachelier, Manager, Telematic Customer Project

Battelle

Rick Simon, Section Manager, Computer and Information Systems/D.C.  
Operations

Cii Honeywell-Bull

Quoc An Hoang, Project and Software Development Manager

Communications Consulting Corporation

Arlene Lessin, President

Continental Illinois Bank

Joseph Coriaci, Senior Vice President and Cashier

Patrick Coll, Vice President, Charge Card Division

Credit Commercial de France

Peter Olav Flaatten Manager of Data Processing

Dahl's Foods

Robert Hand, President

Data Terminal Systems, Inc.

Edward Sonn, Vice President

Diebold Inc.

Chris Hyser, Product Manager Automated Systems

Electronic Funds Transfer Association

William Moroney, President and CEO

First Bank Systems (MN)

Stuart McIntire, Vice President

Federal Reserve Bank System

Steve App, Operations and Procedures Staff

Flonic Schlumberger

Patrick Berthan, Marketing Director, Payment Systems Branch

Food Marketing Institute

Tim Hammonds, Vice President - Research

Sharon Brown

Home Terminal Systems, Inc.

Dale Reistad, Chairman

Honeywell

Richard McComb, International Coordinator, Intelligent Card Program

John Rebello, Honeywell, USA

Joseph Smiraldo, U.S. Program Manager for Intelligent Cards

Hy-Vee Food Stores, Inc.

Richard C. Newell, Treasurer

IBM

John Weisenberger, Manager, Distribution Industry, Marketing Development

INTAMIC

Michel Mermay, General Secretary

Informatique

Roy Bright, Director

(  
International Micro Industries

**Tom Angelucci, President**

**Desmond Warren, Vice President, Marketing**

Iowa Department of Social Services

**Chuck Sweeney, Inspector General**

Iowa-Des Moines National Bank

**Michell A. Christensen, Senior Operations Officer**

**John Sikkink, Executive Vice President**

Iowa Transfer System

**Dale Dooley, Executive Director**

La Redoute

**Jean-Pierre Masclet, Telecommunications Manager**

Long Inc.

**Robert Long, President**

Lucky Markets

**Lee Paulson**

Malco Plastics

**John Hynes, Ph.D, Vice President R&D**

**Larry Linden, President**

Maryland Switch, Inc.

**Normal Foster, Chairman (from First National Bank of Maryland)**

**Robert Symonds, President**

Metroteller Systems, Inc.

Joseph Wolfson, President

National Association of Convenience Stores (NACS)

Kerley LeBoeuf, President

National Association of Retail Grocers (NARGUS)

Lewis Norwood, Director, Affiliate Relations

NCR Corporation

Peter Bradley, Program Coordinator, EPTS

Elmer Bradshaw, Manager, Federal System and Services

John M. Saccamanno, Account Manager, Retail

Mitchell J. St. Thomas, Manager EFT Systems and Services

James A Schulte, District Manager, Iowa

New York City Human Resources Administration

Al Giove, EPFT Project Coordinator

OAI, Inc.

Al Irato, Vice President

Publix Food Stores

Mike Lucas, Director of Scanning and ATM Programs

Rocky Mountain Bank Card System

Stanley Anderson

(  
Safeway Food Stores

Cliff Grant, In Store Banking Project Manager

Sharp Electronic Corp.

John Moore, Jr., Government Sales Manager - ECR/Banking and Financial Systems

State of Michigan Department of Social Services

Noble Kheder, Deputy Director

Leland Hall, Director of Office of Food Programs

Dave Wigent, Deputy Director, Food Stamp Programs

William Minihan, Financial Officer

State of New Mexico

Jerry Standard, Chief of Food Assistance Programs

Al Powell, Director of ADP

Sweda

Dick Simon, Vice President

The Money Service

Dave Kowalke, Sales Manager

TRANSCryption, Inc.

Milt Goldfein, Partner

Transition Magazine

Jeffrey Kutler, Editor

USDA, FNS

Jack Curry, Iowa Regional Office

U.S. Treasury

Russell Morris, Assistant Commissioner, Bureau of Government Financial Operations

David Smythe, PACS Accounting System

VISA, U.S.A.

David A. Huemer, Senior Vice President

Willard Bishop Consulting Economists, Ltd.

Willard Bishop Jr., Ph.D, President

## APPENDIX C

### GLOSSARY OF ACRONYMS

ABA	American Bankers Association
ACH	Automated Clearinghouse
ADP	Automated Data Processing
ANSI	American National Standards Institute
ATM	Automatic Teller Machine
ATP	Authorization-To-Participate Card
CPU	Central Processing Unit
CRT	Cathode Ray Tubes
DMU	Data Management Unit
EBT	Electronic Benefit Transfer
ECR	Electronic Cash Register
EDP	Electronic Data Processing
EFT	Electronic Funds Transfer
FNS	Food And Nutrition Service
FRCS	Federal Reserve Communications System
FRS	Federal Reserve System
HIR	Household Issuance Record
ID	Identification
ISO	International Standards Organization
ITS	Iowa Transfer System, Inc.
LED	Light-Emitting Diode
MICR	Magnetic Ink Character Recognition
NCR	National Cash Register
OCR	Optical Character Recognition
PIN	Personal Identification Number
POS	Point-Of-Sale
PTT	Postal, Telephone, and Telecommunications Ministry of France
SCR	Smart Card Reader
TACS	Treasury Automated Communications System
UPC	Universal Product Code
USDA	United States Department of Agriculture

APPENDIX D

ADDENDUM TO FEASIBILITY REPORT—  
REPORT ON THE SMART CARD SEMINAR

March 9 and 10, 1982  
Scottsdale, Arizona

APPENDIX DREPORT ON THE SMART CARD SEMINAR  
by Richard E. Sprague

This Addendum is a brief report on the Smart Card Seminar held by Intelmatique in Scottsdale, Arizona on March 9 and 10, 1982. New information gathered on the cost and technical aspects of the chip-in-card technology has been included in the body of the final version of the report and in the recommendations to FNS for further action. This Addendum provides additional detail on the status of chip-in-card development in France and in the United States.

1. IMPORTANCE OF FRENCH CHIP-IN-CARD SYSTEM STATUS AND  
PLANNED NEAR FUTURE POS TESTS

Since the Department of Agriculture is seriously contemplating a test of the chip-in-card, off-line systems approach or an EBT system, an appraisal of French tests in point-of-sale projects is very important. The reason for this is that there are no true POS projects announced or planned in the U.S. using chip-in-card techniques. There are also no U.S. suppliers of chip-in-card systems as of this date, and no experience to base a judgement on, outside of France. USDA and the States will be heavily dependent on systems vendors and chip-in-card suppliers for such a U.S. test. Presently all of these are French. The only planned POS payment tests are in France. The only banks and retailers involved in plans for POS tests are in France. Hence, the Smart Card Seminar conducted by Intelmatique, an agency of the French government, on March 9-10 in Scottsdale Arizona was an extremely important source of information about what is really happening in France, and what will probably happen this year, as well as what probably will not happen.

Successful POS tests of three chip-in-card systems scheduled to begin in June-July this year in France, with cooperative participation by retailers as well as banks, would provide USDA with a higher confidence level that a similar EBT test could be conducted in the U.S. On the other hand, if the three tests do not start, or do start and fail for any reason, USDA may be in a risky situation by proceeding with a U.S. test.

(1) Factors Contributing To The Success Or Failure Of French Tests

The following factors will have an influence on whether the three French POS tests are successful or not:

- The performance of the systems technically
- The successful support of the three vendors involved
- The agreement and cooperation of the retailers

- The business and financial relationships between the banks and the retailers
- The support of the French government
- Eventually, the acceptance of the systems by consumers

The success of a U.S. test will depend on similar factors.

#### (2) Conclusions Regarding Tests From Smart Card Seminar

Based on the information gathered at the Smart Card Seminar it can be concluded that the factors listed above look favorable for the success of the three tests except for the third and fourth, which may be critical. The agreement and acceptance of the French retailers appears to be very much in doubt. The proposed business and financial relationships between the French banks and retailers do not appear to be conducive to retail participation in the three tests. As a result, there appears to be a good possibility that the retailers will not participate and that the tests will not take place, or if they do start, they will not be successful.

#### 2. HISTORY OF FRENCH TESTS

Four years ago, when the French banks and retailers initiated discussions about using chip-in-card off-line systems for point-of-sale payments, the association of French retailers called Gencod was heavily involved. In fact, the first organizing meeting of the initial group of banks and retailers was held at Gencod headquarters in mid-1978. Gencod, and its large department store, supermarket, and hypermarket retail members, actually took the lead in suggesting a national POS payment system. They were planning to become actively involved in the planning and design of the system with the banks. Originally, the biggest French commercial banks, all belonging to the Carte Bleue group, did not join the project. They were afraid the chip-in-card would detract from their own Carte Bleue card. Also the French postal giro (Cheques Postaux) division of the PTT did not join. The bank leaders were Banque Populaire (a major cooperative bank), savings banks, and some smaller commercial banks.

During the interim four years since that first meeting, several things changed. The Carte Bleue banks joined the group, along with Credit Agricole, Credit Commercial, and the postal giro. They got together to form G.I.E., an association of banks only, devoted to the chip-in-card project. Meanwhile, Gencod became inactive. This was undoubtedly due to the fact that all of their members are large retailers, both food and general merchandise. These retailers, like U.S. retailers, are moving more rapidly now toward their own on-line point-of-sale systems. The supermarkets and hypermarkets are now installing scanning systems using the European Article Numbering (EAN) codes and bar code symbols. This is the European-international version of the U.S. Universal Product Code symbol; it uses two more digits and has several other new features.

The department and specialty stores belonging to Gencod are all installing or planning to install point-of-sale systems of their own, some using OCR-A word scanning. The net result has been that the off-line, chip-in-card system no longer has the appeal to Gencod members that it had four years ago.

The G.I.E. bank group now calls all of the shots in the POS system design approach. The retailers have little or no say about it. This will lead to trouble just as it has in every other project around the world.

### 3. STATUS OF RETAILER PARTICIPATION IN TESTS

At the Smart Card Seminar it was extremely difficult to find out what retailers are participating in the three French tests. No one at the seminar knew who the retailers are. The systems suppliers all stated they do not know and have not been involved in approaching the retailers. Honeywell and Cii-Honeywell Bull had the impression that all of the retailers in their test in Blois were very small. A similar opinion was expressed by Flonic, whose test is in Lyon, where the very small retailers are all in the central part of the city. Large retailers in Lyon were said to be on the outskirts and suburbs where large shopping malls are located.

The Intelmatique people, Ray Bright and Arlen Lessin, did not know who the retailers will be. They said there is no list of them available. There were no retailers present at the seminar, though preliminary announcements indicated there would be at least one spokesman for the French retailers attending.

The man advertised on the program as a retailer was Jean Pierre Masclet, of La Redoute. It turned out he is with a mail order firm, and is participating in the Videotex trial in Velizy, not in the POS trials. However, he provided the best clues as to what is really going on in the project. Other clues were provided by Peter Olau Flaatten from Credit Commerciale de France, who was the spokesman for G.I.E. and the French banks.

#### (1) La Redoute And The Retail/Bank Financial Relationship

The best indication that things are "not right" in the three tests comes from Mr. Masclet of La Redoute. He said that La Redoute owns several general merchandise stores, one of which is a 1,500 square meter men's clothing store in the center of Lyon. Approximately at the end of February they were approached by the G.I.E. to join the Lyon test. Their people asked Masclet for his recommendation and he discovered they had not been told by the banks that they would have to pay the banks for the terminals and the transactions. When they found that out, they said they would not participate unless those charges were reduced or eliminated.

La Redoute's store in Lyon has ordered an IBM 3650 retail point-of-sale system for installation in June 1982, about the time when the test will begin. Mr. Masclet expressed the opinion that they would not want a separate chip-in-card device sitting beside their IBM terminal and would not want to have to re-enter the amount of the sale on a separate keyboard. Nor would they want to have a printer separate from the IBM printer for preparation of a customer's receipt. IBM will not discuss with La Redoute an interface between their 3650 terminal and the chip-in-card reader.

Mr. Masclet was not aware of any other retailers in Lyon that have agreed to participate in the test.

(2) G.I.E.'s And Pierre Flaatten's Information About Retailers

In his formal presentation, Mr. Flaatten stated that the retailers in the three tests would be required, after two months, to pay the bank \$40 per month for the chip-in-card device and 0.6 to 1.2 percent of the value of each transaction, depending on volume and transaction size. Since these tests are being promoted as electronic checkbook tests, with the payment services substituting for checks and cash, the retailers will not want to pay anything for the transactions. They pay nothing for checks and cash now. They will certainly not want to pay anything for the terminals if they already have their own ECRs and scanners or POS systems. Historically, European and especially French retailers have been even more reluctant to pay banks any money at all for POS-EFT than American retailers.

Mr. Flaatten said he did not know who all of the retailers were in the three tests, and that "not all of them have been signed up yet." When asked who did know who the retailers were and if there were actually any retailers signed up and whether a list of them exists, he said that the people who know this are not the banks or the suppliers, but G.I.E. He said that G.I.E. was actually depending on the Chambers of Commerce in the three cities to obtain commitments from the retailers, and he was not sure how that effort stands. When asked whether he thought retailers would actually pay \$40 per month and 0.6 to 1.2 percent for transactions, he said he thought they would.

He was asked whether any food retailers are involved in the three tests. He said yes there were some small food retailers and one large supermarket chain, Euro Marche. The latter will be participating in the Blois and Caen tests, he said.

Euro Marche is a giant checkout style hypermarket with many checkstands in each store. They have long ago been planning the installation of EAN scanning systems and, in fact, participated heavily in the establishment of the EAN symbol and code standard through CIES (European equivalent of FMI) which is headquartered in Paris.

The chances that Euro Marche will

- Pay the banks anything
- Accept a separate device from their own POS terminal
- Accept customers using PIN pads
- Accept the procedures proposed by the banks at the point-of-sale
- Participate in the Blois and Caen tests

are almost none.

The chances that local Chambers of Commerce in Lyon, Blois, and Caen will be able to obtain commitments from retailers on behalf of the banks, based on these conditions, are also probably very low.

(3) Summary Of Appraisal

- No French retailer appeared at the seminar
- No one would admit to knowing what retailers have actually made commitments
- The one mail order firm that did appear believes their retail store in Lyon will not participate under the existing proposed conditions (La Redoute)
- The banks have taken over and now dominate the POS chip-in-card project and tests, while the retailers as a group have dropped out
- A very large hypermarket, Euro Marche, with its own POS systems, is believed by the banks to be willing to participate under these unacceptable conditions
- There is no listing or documentation available (and no indication of its existence) that any retailer has made a commitment to participate in the three tests—and the start date is only three months away.
- The organizations assigned the tasks of convincing the retailers are the local Chambers of Commerce. They would seem to have even less chance than the banks of "selling" the retailers.

(4) Recommendations And Conclusions About French Test

Further appraisals are needed of the true French situation, by talking to the retailers. Direct contact should be made with the local retailers in the three cities. USDA should not take the word of anyone else about the retailer's attitudes and whether they will make commitments. Channels that could be used to reach them include:

- CIES - The food retailer association - Paris
- AIDS - The department store association - Paris
- Gencod - Paris
- La Redoute
- Euro Marche
- Chambers of Commerce in Lyon, Blois, and Caen
- NCR, Sweda, DTS, IBM, and other suppliers of retail systems and ECRs in the three cities.

Until and unless there is a better indication than that coming from the seminar that retailers will participate, the tentative conclusion must be reached that they will not, and that tests will not take place. If tests do not take place, vendors will have a difficult time making any progress in the U.S., as well as in France.

#### 4. STATUS OF VENDOR SUPPORT IN U.S.

Some concerns have been registered prior to the seminar that French vendors might not be able to support chip-in-card systems in the U.S. Also, traditional U.S. vendors that dominate the U.S. market for POS systems and ECRs in food retailers, are known to be opposing the introduction of French technology for POS payments.

The seminar confirmed the latter situation. U.S. retail equipment vendors (IBM and NCR) were present but silent. The French vendors do not supply the retail industry either in France or in the U.S. As a result they know very little about retail needs. This is a very real problem for USDA.

The first concern is not as significant. Two of the French suppliers appear to have supporting organizations that could be adequate. Cii-Honeywell Bull seems to be linked closely enough to Honeywell to provide support. No mention was made of any separation problems due to French nationalization of Honeywell Bull and they appear to be cooperating fully. Philips has Philips Information Systems in Dallas and also North American Philips in the U.S. for support. Schlumberger has no one, although they own Fairchild Electronics.

#### 5. CHANGES TO AND STATUS OF SYSTEM DESIGN EQUIPMENT

The original French concept of the POS payment system design was quite attractive to the retailers represented through Gencod. It was presented by Mr. Moreno, president of Innovatron, and the original licensees of his patents. It was this off-line approach (coupled with minimal equipment at the point-of-sale interfaced to the retailer's own ECR or POS terminal) that caught the retailer's interest in the first place. The POS equipment was to cost about \$100 to \$200 since it only involved a black box capable of supplying power to two cards, the consumer's card and the retailer's card, and reading the cards. Everything else was to be done by the ECR.

Two things apparently happened to change this. First, the retailers dropped out of the requirement specification process. Second, the suppliers that became involved knew little about retail equipment or POS systems and do not supply that market. The result has been to change the entire nature of the equipment at the POS to make it far more expensive and not compatible with retailer's desires. It has also negated part—if not all—of the advantages of building an off-line system: the cost of the newly designed, proposed system may be larger than an on-line system.

The devices to be used in the three tests now have a "bank design" flavor. They resemble the POS-EFT terminals introduced in the U.S. by AM International and others, called the AMCAT type of terminal. It is a separate stand alone unit, sitting on a retail counter beside an electronic cash register or retail POS terminal.

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It has a keyboard, printer, display, card reader, cartridge, logic, power supply, PIN pad attached, and other features found in the bank EFT terminals here. It is not cheap. Further, as has been learned in the U.S., it is unacceptable to most retailers for a variety of reasons.

In other words, the POS system already learned to be unacceptable to retailers in the U.S. and already on the way out, is being introduced in France as the latest advance in POS payment systems. This helps explain why few retailers have signed up for the tests.

APPENDIX E  
EQUIPMENT AND SYSTEMS IN USE  
BY FOOD RETAILER

## EQUIPMENT AND SYSTEMS IN USE BY FOOD RETAILER

### 1. EQUIPMENT AND SYSTEMS USED IN FOOD RETAIL TENDS TO VARY BY THE SIZE OF THE RETAILER

In order to explore the reasons for food retailer resistance and the failure to adopt point-of-sale electronic funds transfer systems marketed by financial institutions, it is necessary to classify the retailers by size and type. The important dimension with respect to size is the kind of equipment or system they can justify at the point-of-sale. Food retail point-of-sale systems and equipment vary greatly, on a spectrum ranging from (essentially) a box for holding cash and a manual means of keeping transaction records, to the sophisticated point-of-sale systems using electronic terminals and universal product code (UPC) scanners, with minicomputers and random access storage devices in the food store.

To simplify the description of the spectrum of size and classes of equipment, the following definitions will be used:

- Large Food Retailer—A supermarket or other large food retailer able to justify a point-of-sale system within its stores such that a minicomputer or on-line communications capability exists at the store level. The system may or may not use scanners.
- Medium Food Retailer—A grocery store or other type of food retailer not able to justify a point-of-sale system with a minicomputer at the store level, but able to justify electronic cash registers\* (ECR) at point of sale. In general, these ECRs are not terminals and are not directly connected to anything in the store or elsewhere.
- Small Food Retailer—A food retailer not able to justify an electronic cash register. The small retailer may be using an electromechanical cash register or no cash registers.

#### (1) Large Food Retailer Systems Increasingly Use UPC Scanning

The point-of-sale systems being installed by large food retailers are now dominated by Universal Product Code (UPC) scanner types of systems. When the food industry began its UPC efforts in the early 1970s, the original justification formula for installing the full scale system was based on a potential increase in productivity at the checkstands of 40 percent. By this was meant that at peak customer transaction periods, a given number of checkstands in a store could handle 40 percent more customers in the same amount of time by using the UPC scanner system. An alternative was that the same number of customers could be handled in the same

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\* The retail definition of ECR is used herein: an electronic substitute for an electromechanical cash register.

amount of time with a 40 percent reduction in the number of checkstands and a corresponding reduction in personnel and other related costs. Any combination of checkstand reduction or increased throughput adding up to 40 percent was considered possible.

Assuming the 40 percent formula to be correct, the major supermarket chains believed they could justify installing UPC scanner systems in any store with eight or more checkstands. While the 40 percent figure has not always been achieved, nevertheless substantial productivity improvement has been.

The UPC scanner system evolution did not move as fast as predicted. Several problems arose. The usual implementation problems experienced in any sophisticated on-line information system occurred, plus others unique to the food retail environment:

- The entire UPC concept depends on placing the omnidirectional bar code labels on a large majority of food merchandise at the manufacturing or labelling points. This program did not move as fast as anticipated. Food retailers were reluctant to install more than pilot stores since hand keying the identification numbers at the points of sale was necessary for unlabelled merchandise and this reduced the 40 percent savings formula considerably.
- In a few instances, consumer resistance to leaving the price off of the merchandise caused problems. The costs of hand stamping prices on already labelled merchandise cut into the 40 percent savings, sometimes reducing it by one-half.
- Much of the incentive for UPC system installations comes from merchandise control improvements and other benefits not directly associated with POS productivity. The software and systems designs in these areas were slower to develop than predicted.

Nevertheless, by the end of the 1970s, most of these difficulties were surmounted and by now, nearly all large supermarket chains are installing UPC scanner systems as fast as they can be assimilated by their organizations.

Several developments have aided in this process. Systems costs have come down appreciably. Microcircuit chip technology has reduced the cost of terminals and other computer elements considerably. At least one supplier, Data Terminal Systems (DTS), has adopted an approach using chip technology to put nearly all of the store level equipment in the terminals at each checkstand, rather than centralizing it in the store.

As a result, food retailers with only two or three checkstands per store can now justify UPC scanner systems. Industry forecasts show that by 1985 there will be very few large food retailer stores not equipped with UPC scanner systems.

(2) Food Stamp Handling Procedures In Large Stores Are Similar To Cash Handling

Once food stamps are placed in a cashier's cash drawer, they are accounted for and handled just as though they were currency. Each cashier has his own cash drawer which is locked and under control at all times. A cashier, starting his shift, inserts his own drawer in the POS terminal. It has a beginning supply of cash and stamps

with which he is charged. At the end of his shift, the POS terminal assists in closing out the cash drawer. The closing procedure culminates in a so called "register balancing" function, in which the total value of currency, checks, food stamps, coupons and bottle returns, taken in during the shift must be balanced with the total value of food sales handled by the POS terminal during that shift.

In the balancing procedure, food stamps, currency and checks are treated as cash. They are wrapped in a bundle at the end of the procedure and the POS terminal printout showing the breakdown of payments and money value received is attached to the bundle. The entire bundle with the audit trail printed record is then collected by the store manager, verified, and sent to the store's bank. The bank treats the food stamps as cash also, and after a verifying procedure, deposits the total value for each cash drawer to the retailers' account.

(3) Medium-Sized Food Retailer Equipment Tends To Be Electronic Cash Registers

Another development brought about by chip technology is the reduction in cost of electronic cash registers (ECRs). More importantly, the entire cash register manufacturing industry has converted from mechanical and electromechanical cash registers to electronic cash registers. It is no longer possible to purchase a new electromechanical register.

The Japanese have led the way in this revolution. National Cash Register (NCR), DTS Sweda, and others based in the U.S. have been forced to keep pace. Low priced ECRs from Japan can be purchased for as low as \$300. The ECR price ranges go as high as \$2,000. At the upper and middle ends of this range, \$750 to \$2,000, the ECR usually has the capability of adding on-line communications capability, or electronic modules to interface with other devices comparable to retail point-of-sale terminals. Some of these include various hand held label readers, such as optical character codes, bar codes, magnetically encoded labels, and magnetic tape cassettes.

(4) Small Food Retailers Are Moving Toward ECRs

Small food retailers are buying electronic cash registers by the millions. The small corner grocery or delicatessen run by one family, which used a cigar box and an adding machine at the point of sale a few years ago, usually now has a Japanese electronic cash register. As a result, the medium size food retail category is growing and the small food retailer category (by our definition) is shrinking.

2. ATTITUDES OF RETAILERS TOWARD POS-EFT ARE ASSOCIATED WITH THE EQUIPMENT IN WHICH THEY HAVE INVESTED

Literally dozens of attempts to entice food retailers to participate in true point-of-sale (checkstand) electronic payments have failed. Supermarkets have refused to get involved in such systems and have refused even to discuss the subject with financial institutions. The entire food retail industry has taken an extremely negative view toward electronic payments at the checkstand through the last decade. EFT committees have been formed and disbanded by the food retail industry.

Recent POS-EFT history can be described as entirely negative with respect to any interest on the part of supermarkets or smaller grocery stores in any system for payments beyond the ones already in existence. Initial reactions from food retailers to

interviews with the Birch & Davis Associates, Inc./Orkand study team and to the USDA meeting on smart card systems, have been similarly negative and conservative. The overall attitude can be summed up by the question asked by the Food Marketing Institute: "What's wrong with today's food stamp payment methods? We're happy with them?"

(1) The Attitudes Of Large Food Retailers Are Based Upon The Investments Made In UPC Scanning

The attitudes of large food retailers are based on the extremely large investments they have made—with money, effort, procedures changes, industry policies, personnel training and many other investments—in the UPC scanner concept, which involves the entire food industry, not just the retailers. Food manufacturers, food product packagers, and packing materials suppliers, printers and labellers, distributors and wholesalers, and systems and equipment suppliers, have invested billions of dollars and very significant industry changes into the concept. Even the unions in food stores are involved.\*

The tendering of cash or other payment media is now different and streamlined to maintain productivity. The delays formerly tolerated in handling the payment part of a transaction, and the bagging part, can no longer be tolerated. Check cashing, in general, has been moved away from the checkstand. As a result of all this, the large food retailer offers one most important guideline for any new POS payment proposal; one word, "productivity," describes this attitude.

(2) Medium-Sized Food Retailers Have Not Made The Same Commitment To POS Systems, But Still Would Be Unwilling To Invest In New Equipment

The medium sized food retailers have most of the same general attitudes toward point-of-sale payment systems from financial institutions that the large food retailers have: mostly negative and conservative. There are some differences worth noting, however; they have not made the same high level of investment in POS systems and they do not need to emphasize productivity nearly as much because they have not used it to justify big systems investments.

The number of transactions in a peak period in a store with one or two cash registers does not produce the same kind of problem as it does in an eight or ten lane supermarket. Customer loyalty, food shopping habits, and personalized service in a medium-sized store are much more important than the length of the queue or waiting time. As a result, the acceptability of a different procedure for an EBT system compared to the use of food stamps may be much greater than in a large store.

On the other hand, the attitude toward cost justification and paying for either equipment or service will be even more negative and conservative than for a large store. In most cases, there is no way for the store owner to have available savings

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\* For example, at each checkstand where there was a cashier and a food bagger before, there is now just a cashier/bagger. The training of that cashier/bagger is quite different than before. The UPC scanner system involves a two handed scanning and bagging movement that must be very continuous and fluid to gain the maximum improvement in productivity at the checkstand. It requires new skills.

or money to pay for a new piece of equipment or a service that would eliminate food stamps in the store. If, however, USDA put a new device in the store that used an ECR connected to a dial up terminal reading a card, and charged nothing for this, including no charge for phone calls, the owner would probably be receptive to the new system.

(3) Small Retailers' Attitudes Are Similar To Those Of Medium-Sized Food Retailers

The small retailer, under our definition is one with no real chance of using an ECR for data entry. In these cases, the point-of-sale equipment will be either nothing or an old electromechanical register or a very cheap electronic cash register. The small retailer's attitude toward EBT and food stamps will be much the same as the medium sized food retailer. Hence, the best approach might be an off-line option, using smart cards or decremented cards, if fully developed. Under no foreseen circumstances, however, will the small food retailer pay for or contribute to the purchase of a food stamp replacement or its associated equipment.

3. SUPPOSED AND REAL POTENTIAL ADVANTAGES OF POS FOR LARGE FOOD RETAILERS

One of the great disagreements between large supermarkets and financial institutions over the justification for electronic point-of-sale payment services is whether the retailer can save money. Financial institutions have proposed cost savings for the retailer that the retailer claims do not exist or are greatly exaggerated. They have resisted paying anything for these services and have also resisted paying for any new equipment needed in their stores. Banks have suggested various kinds of savings and benefits, such as reduction of float and delay time in receiving credit for deposits of cash and checks. Savings in check handling costs and bad debt losses due to fraudulent checks or insufficient funds are also proposed by banks. The supermarkets reject these savings and benefits as being unrealistic. They claim proof, through industry studies, that their check losses are insignificant and that float also is not significant.

The large supermarkets' profit margins are so low and the overhead costs involved in the record keeping and financial end of the business are so stripped down that paperwork savings are difficult to achieve.

Few, if any, savings would be possible for a large supermarket chain if an EBT system did nothing more than eliminate food stamps:

- It would not be possible to eliminate any personnel
  - Each cashier will still be handling currency in the same way as before
  - The store manager can not be eliminated
  - There is no back office staff
- The cash drawers would not be altered
- The bundling of checks and currency would still take place

- The auditing and counting procedures used by the banks and the retailers would still be the same
- The delay in receiving credit for deposits of checks and cash would not change, as the only savings in float would be the one or two days worth of interest on the food stamp money value (food retailers say this amount gets lost in their accounting procedures).

In summary, it can be safely predicted that large food retailers will be unwilling to pay the Department of Agriculture, the state agencies or the banks for the elimination of food stamps.

Any equipment costs within stores will have to be borne by USDA or the state agencies, based mainly on the attitude that the fraud and inefficiency problems involved with food stamps lie outside the food retailer's sector of the system.

However, there are indications that some of the more progressive large food retailers would be receptive to an EBT system that was part of an overall payment system involving the financial institutions, designed to eliminate or reduce all paper forms of payment at the point-of-sale. This would include elimination of checks and a substantial reduction in the amount of cash used for payments. Even this option must not disturb POS productivity, however. Some indications of the receptivity to such a system are seen in the willingness of some retailers to accept in-store banking systems. These services usually involve the installation of either customer-operated or clerk-operated devices at service locations within the food store, away from the checkstands. Services range from check cashing authorization to check guarantee, to full banking services such as deposits, withdrawals, balance inquiries, bill payments and transfers among accounts. The devices are usually automated teller machines with cash dispensers or clerk operated terminals or check validating devices. In some cases a branch bank is actually located inside the store.

The reasons large food retailers accept these services include the fact that they are paid by the financial institutions to permit the installations. Also, they do not view these services as interfering with their normal business or with the payment procedures at the point of sale. The service desk installations are viewed as something completely different, as would be a branch inside the store.

So, noting this area where possibilities appear to exist and the development and increasing use of debit banking cards, there is reason to pursue EBT development with food retailers if it is coupled with a system bringing them advantages.

4. FOR ANY POS OR EBT SYSTEM TO SUCCEED, FOOD RETAILERS MUST BE PRIMARILY RESPONSIBLE FOR THE DESIGN

In country after country during the last fifteen years, there is evidence of failure of POS systems to be accepted by retailers. If there is any lesson to be learned from this history, it is that the retail group for whom the POS system is to be designed must be the prime designer of its own system. This is especially true of the food retailing industry because of the investments made to date in equipment and procedures, as described above. Therefore, USDA must get large and small food retailers involved directly in the planning and design of EBT systems, whether on-line or off-line or face the possibility of the same fate.

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